

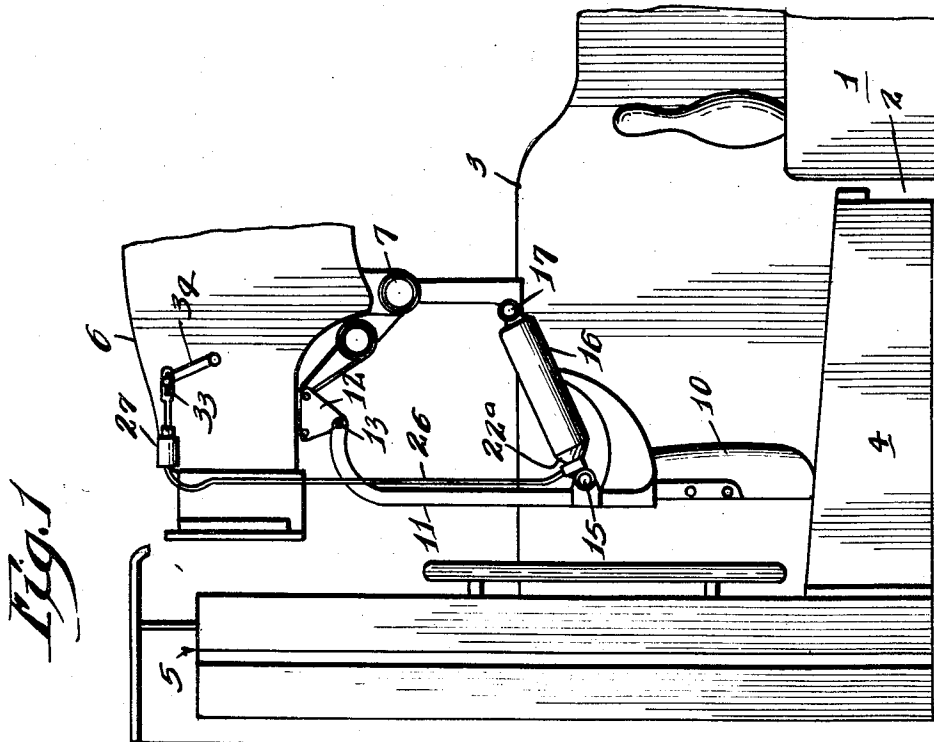
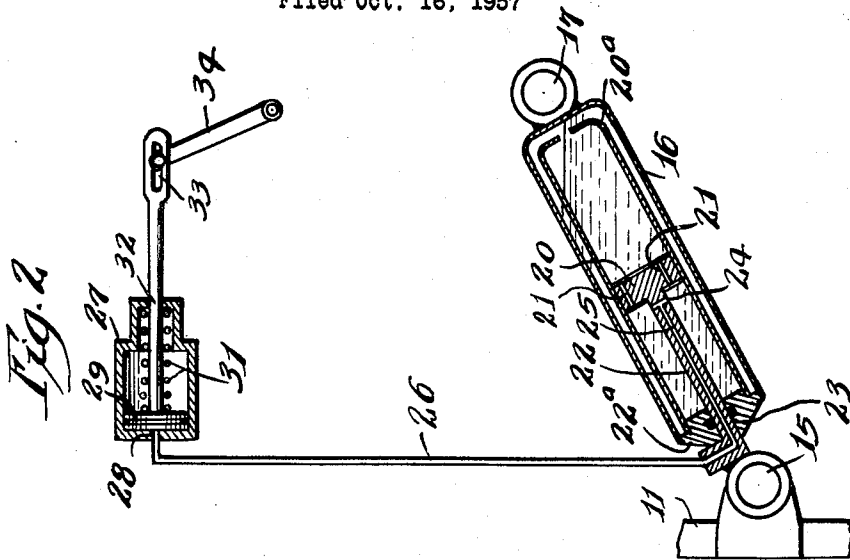
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AUTOMATIC PINSETTER TRIP DEVICE

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AUTOMATIC PINSETTER TRIP DEVICE

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4 Claims. (Cl. 273—43)

This invention relates to an automatic pinsetter and more particularly to a trip device for initiating operation of an automatic pinsetter upon entry of a ball into a bowling alley pit.

An object of this invention is to provide new and improved mechanism for initiating operation of an automatic pinsetter upon impact of a bowling ball against the pit cushion.

Another object of the invention is to provide a trip device for actuating an automatic pinsetter utilizing the pressure created in a hydraulic shock absorber for a pit cushion whereby impact of a ball against the cushion operates hydraulic trip means for an automatic pinsetter driving mechanism.

A further object of the invention is to provide mechanism for energizing an automatic pinsetter comprising trip means having a cylinder with a fluid port in one end thereof, a piston slidably mounted in the cylinder and spring urged toward the port, an operating rod connected to the piston, a bowling alley pit cushion mounted for movement when contacted by a bowling ball, a hydraulic shock absorber connected to said pit cushion for cushioning the impact of a bowling ball thereagainst, and means connecting the pressure chamber of the shock absorber with said cylinder port to shift said piston when pressure is created in the shock absorber by a ball hitting the pit cushion.

Further objects and advantages will become apparent from the following detailed description taken in connection with the accompanying drawings in which:

Fig. 1 is a fragmentary side elevational view of an automatic pinsetter embodying the invention mounted on a bowling alley with the nearest alley kickback omitted and with parts of the automatic pinsetter shown diagrammatically; and

Fig. 2 is a schematic drawing of the hydraulic components shown in Fig. 1 on an enlarged scale.

As shown in Fig. 1, a bowling alley has a bed 1, a pit 2, and a pair of kickbacks one of which is shown at 3. An automatic pinsetter mounted on the bowling alley includes as components thereof a pit mechanism 4 and ball and pin elevating mechanism, indicated generally at 5. The operating mechanism for the automatic pinsetter is shown generally at 6 and is supported on a frame 7 mounted on the kickbacks.

A bowling alley pit cushion 10 extends across the pit 2 and acts to absorb the momentum of a bowling ball entering the pit. The pit cushion 10 is mounted by a pair of vertically extending arms, one of which is shown at 11. Each arm 11 is pivotally mounted on a frame supported plate 12 by a pin 13.

In order to cushion the impact of a bowling ball against the pit cushion 10, a shock absorber 16 is pivotally connected one to each of the arms 11 by a pin 15. The other end of the shock absorber is pivoted to a part of the framework by a pin 17.

The operation of the automatic pinsetter is commenced after each ball is rolled and the impact of a bowling ball

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against the pit cushion 10 is utilized to operate a component, such as a drive clutch of an automatic pinsetter.

As shown in the drawings, a trip device for initiating operation of the machine includes one of the hydraulic shock absorbers 16 having a piston 20 formed with conventional passages 21 slidable in a cylinder 20a. A piston rod 22 extends outwardly from an end 22a of the shock absorber and is slidable in an opening 23 in said end. The exposed end connects to the pivot pin 15. The piston rod 22 is provided with transverse openings 24 and a longitudinal passage 25 which connects a hydraulic line 26 with a pressure chamber in the shock absorber cylinder defined by the end wall 22a and piston 20.

A trip means comprises a single acting cylinder 27 having a fluid port 28 at one end connected to the line 26. A piston 29 is mounted in the cylinder 27 and is urged toward the port 28 by a spring 31. The spring 31 surrounds a piston rod 32 which extends beyond the casing 30 and forms an operating rod having a slotted opening 33 for connection with a suitable clutch operating link 34.

In operation, the impact of a bowling ball against the pit cushion 10 will cause a slight rearward movement of the pit cushion about the pivot pins 13 which will also draw the shock absorber piston 20 toward the left, as viewed in Fig. 2, to create a pressure in the shock absorber pressure chamber. This pressure is transmitted through the passages 24, 25, line 26, and port 28 to the trip piston 29 and fluid flows to the trip cylinder 27 to shift the piston 29 toward the right, as viewed in Fig. 2. This shifts the operating rod 32 to operate the link 34. The link movement is used for operating a component of an automatic pinsetter such as a drive clutch. After the ball impact, the pit cushion restores itself to its normal position and fluid flows back into the shock absorber from the trip cylinder 27. The piston 29 returns to normal position under urging of the spring 31.

The inclination of the shock absorber, shown in Fig. 2, permits entrained air to collect at the top of the shock absorber so as to not affect the operation of the mechanism.

I claim:

1. Energizing mechanism for an automatic pinsetter comprising, trip means for an automatic pinsetter component such as a clutch or the like including, a single-acting cylinder having a fluid port at one end, a piston in the cylinder with an operating rod connected thereto and extending from the other end of the cylinder, and a spring engaged between the piston and cylinder for urging the piston toward the port, a pit cushion for receiving the impact of a bowling ball rolled down an alley, means mounting the pit cushion for movement when contacted by a bowling ball, a hydraulic shock absorber connected to said pit cushion for cushioning the impact of a ball thereagainst, and means for transmitting fluid from the shock absorber pressure chamber to said cylinder when a ball hits the cushion to shift the piston against its spring and trip the automatic pinsetter component.

2. Mechanism as defined in claim 1 wherein the hydraulic shock absorber has a cylinder, a movable piston, and a piston rod connected to the cushion whereby the last mentioned piston moves when a ball hits the cushion to create a fluid pressure in said shock absorber, and said fluid transmitting means comprises passages in said piston rod, and a line connected to said passages and leading to the trip cylinder.

3. A trip device for actuating an automatic pinsetter comprising, a bowling alley pit cushion mounted for contact and movement by a bowling ball, a hydraulic shock absorber connected to said cushion for absorbing the shock on said cushion resulting from a ball impact, a hydraulic clutch trip means, and means for operating

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said clutch trip means when a ball hits the cushion including a hydraulic line connected between the trip means and the shock absorber for transmitting fluid from the absorber to the trip means.

4. Hydraulically actuated trip means for an automatic pinsetter component in hydraulic communication with a shock absorber, comprising: a cylinder with a fluid port at one end, a single acting piston within the cylinder with an operating rod extending from the piston through the other end of the cylinder; a spring for urging the piston toward said port and cushioning means for receiving the impact of a bowling ball including, a pit cushion with a hydraulic shock absorber mechanically connected thereto, with fluid transmission means from the shock absorber

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pressure chamber to said cylinder whereby the energy of a moving bowling ball is dissipated by the shock absorber and fluid pressure thereby generated shifts said piston against its spring to trip the automatic pinsetter component.

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