Sept. 12, 1967 F. WHEELER 3,341,239

HANDLE-OPERATED SHEAR PIN LATCH

Filed July 23, 1964 2 Sheets-Sheet 1

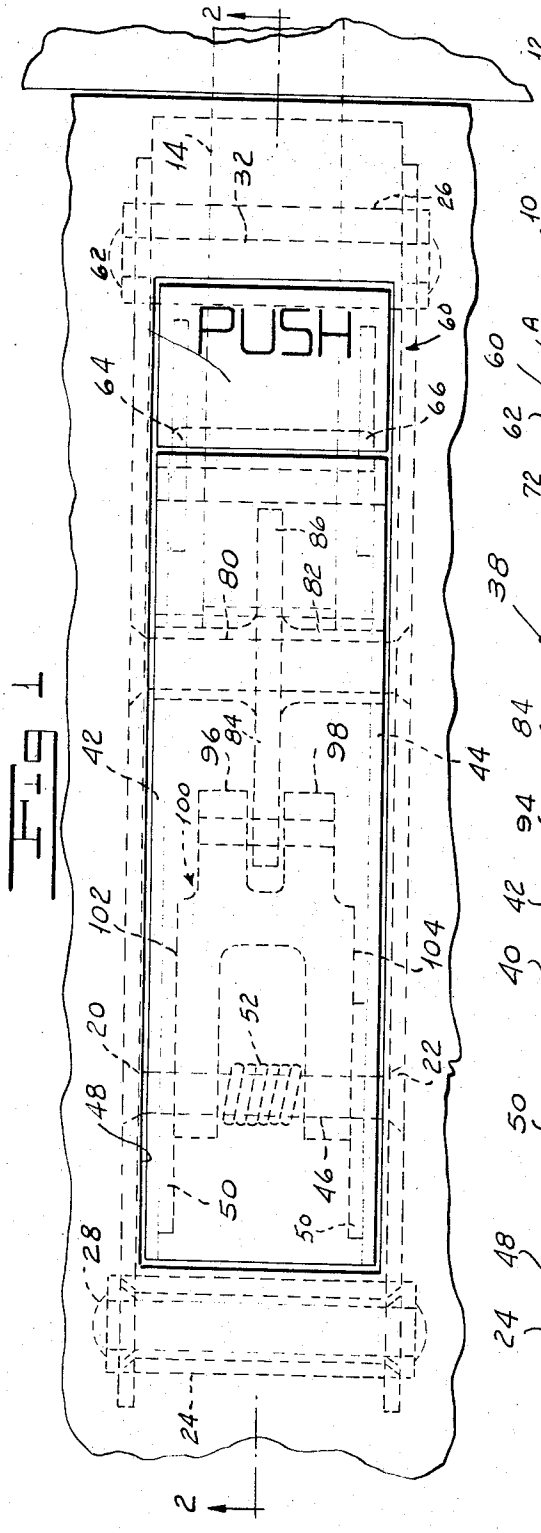


Fig 1

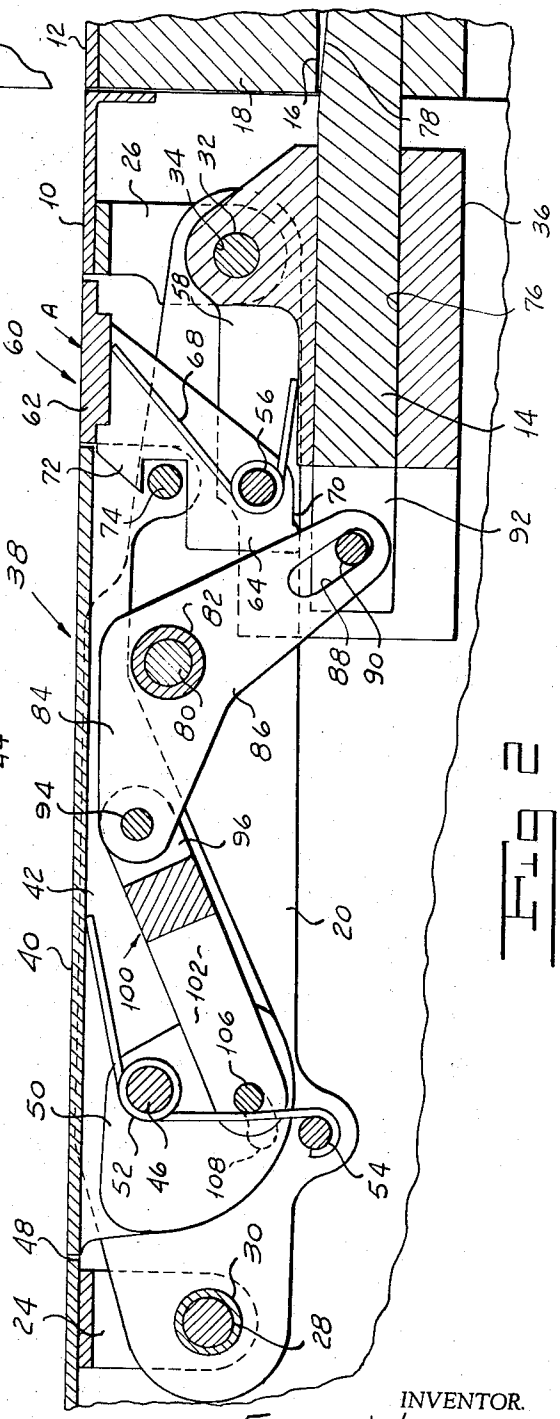


Fig 2

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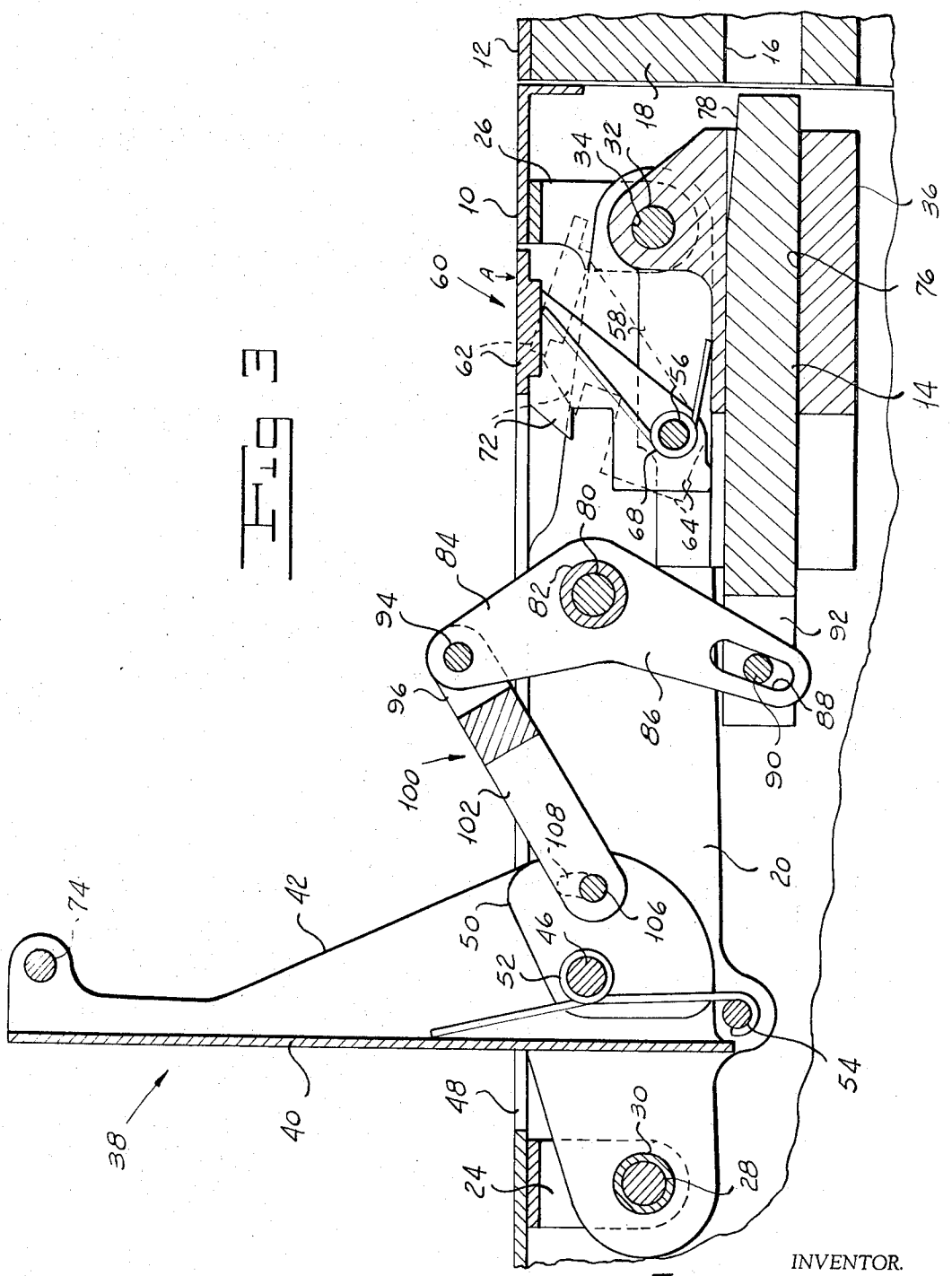


FIG 3

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United States Patent Office 3,341,239 Patented Sept. 12, 1967

3,341,239

HANDLE-OPERATED SHEAR PIN LATCH

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Filed July 23, 1964, Ser. No. 384,616
3 Claims. (Cl. 292—139)

My invention relates to a handle-operated shear pin latch and more particularly to an improved shear pin latch which is more certain in operation than are shear pin latches of the prior art.

There is known in the prior art a class of latches for securing a movable member, such as a door or the like, to a body in which the parts of the latch are out of view of the operator when the latch is actuated. Such "blind" latches commonly are provided with handles which, when closed, are flush with the surface of the member and are held in that position by manually operable catches.

Specifically there is known in the prior art a latch in which a handle, mounted for pivotal movement from an open position out of the opening to a closed position in the opening, carries a pin which rides in the slot of a drive link pivotally connected to a shear pin mounted for sliding movement in a housing from a retracted position to an extended position in which it rides into a receptacle opening provided on the body carrying the member. The handle body supports a catch which is spring urged to engage a pin on the latch frame to hold the handle closed.

The particular latch assembly described above embodies a number of defects. It will readily be apparent that in the event that there is a slight misalignment between the latch-carrying member and the receptacle-carrying body before the latch is operated, it is desirable that the maximum thrust be applied during the initial movement of the shear pin so that the parts can be cammed into alignment as the shear pin moves home into the receptacle. In the structure described above, the thrust force exerted on the shear pin during its initial movement is relatively low and increases as the pin moves home. Thus, operation of the latch may not readily overcome a misalignment of the parts.

Owing to the fact that the catch in the latch of the prior art is supported by the handle body, of necessity it is relatively small and consequently is not as easy to operate as is desirable.

In the particular latch described above, upon release of the catch the handle must be grasped to withdraw the shear pin from its receptacle. In that construction, after release of the catch difficulty is encountered in initiating movement of the handle out of its opening to release the latch.

I have invented an improved handle-operated shear pin latch which overcomes the defects pointed out above. My latch assembly applies its greatest thrust force to the shear pin during the initial movement of the shear pin into its receptacle. My latch assembly has a catch which is mounted independently of the handle so that it has a width which is substantially that of the handle for easy operation of the catch. I provide my latch assembly with a limited amount of freedom of movement between the handle and the shear pin actuating linkage so that the handle is readily accessible upon release of the catch.

One object of my invention is to provide an improved handle-operated shear pin latch which overcomes the defects of latches of the prior art.

Another object of my invention is to provide an improved handle-operated shear pin latch which readily overcomes minor misalignment of the parts being secured.

A further object of my invention is to provide an improved handle-operated shear pin latch in which the maximum thrust force is applied to the shear pin during the initial part of its movement into a receptacle.

Yet another object of my invention is to provide an improved handle-operated shear pin latch in which the handle is readily accessible upon release of the catch.

A still further object of my invention is to provide a handle-operated shear pin latch in which the catch is more readily operated than are handle catches of latches of the prior art.

Other and further objects of my invention will appear from the following description.

In general my invention contemplates the provision of a handle-operated shear pin latch in which a shear-pin-driving bell crank arm is positioned generally perpendicular to the path of movement of the shear pin in the open position of a latch operating handle connected by a driving link to the other bell crank arm. A spring loaded catch supported by the latch assembly frame engages a pin on the handle to hold the handle in its closed position. I provide limited lost motion between the handle and the driving link to permit the handle to spring to an accessible position upon release of the catch.

In the accompanying drawings which form part of the instant specification and which are to be read in conjunction therewith and in which like reference numerals are used to indicate like parts in the various views:

FIGURE 1 is a plan view of my improved handle-operated shear pin latch.

FIGURE 2 is a sectional view of my improved handle-operated shear pin latch taken along the line 2—2 of FIGURE 1 and showing the shear pin in its home position in its receptacle.

FIGURE 3 is a sectional view of my improved handle-operated shear pin latch showing the parts in the positions occupied thereby when the latch is released.

Referring now to the drawings, my improved handle-operated shear pin latch is adapted to be operated, for example, to secure a member **10**, such as a door or the like, in closed position with relation to a body **12** by moving a shear pin **14** into a recess **16** in a receptacle **18** carried by the body **12**. My assembly includes a pair of spaced frame sides **20** and **22** supported on respective brackets **24** and **26** carried by the member **10**. In the embodiment shown in the drawings, a bolt or the like **28** carrying a spacer sleeve **30** secures the sides **20** and **22** in spaced relationship on the bracket **24**. A mounting bolt **32** extends through an opening **34** in the shear pin mounting block **36** to be described in detail hereinafter and through the sides **20** and **22** to mount the sides in spaced relationship on the bracket **26**.

The operating handle, indicated generally by the reference character **38**, of my assembly has a top **40** and spaced side flanges **42** and **44**. A pin **46** carried by the sides **20** and **22** pivotally supports the handle **38** on the sides **20** and **22** for movement from the open position shown in FIGURE 3 in which the handle extends out of an opening **48** in the member **10** to a closed position shown in FIGURE 2 in which the top **40** of the handle **38** registers with the opening **48** so as to be flush with the surface of the member **10**. Preferably I provide the flanges **42** and **44** with reinforcements **50** in the area of the pin **46** to provide an appreciable bearing surface for the handle. A spring **52** carried by the pin **46** bears with one end against the underside of the top **40** of handle **38** and bears with the other end on a pin **54** supported by the sides **20** and **22** normally to urge handle **40** to the position shown in FIGURE 3.

A pin **56** mounted in a recess **58** at the top of the block **36** pivotally supports a catch indicated generally by the reference character **60** for pivotal movement with relation to the block **36**. Catch **60** has a top **62** and side flanges

64 and 66 through which pin 56 extends. A spring 68 on the pin 56 bears with one end against the underside of the top 62 and with its other end against the base of the recess 58. Spring 68 normally urges the catch 60 to a position at which stops 70 on the flanges 64 and 66 engage the base of the recess 58. In this position of the catch 60 its top 62 registers with opening 48.

I provide the flanges 64 and 66 with hooks 72 adapted to engage a pin 74 supported between the side flanges 42 and 44 of the handle 38 in the closed position of the handle shown in FIGURE 2.

From the structure just described, it will readily be apparent that with the parts in the position shown in FIGURE 2, pressure may be exerted on the top 62 of catch 60 in the area indicated by the arrow A in FIGURES 2 and 3 to pivot the catch in a clockwise direction on the pin 56 to move the hooks 72 out of engagement with the pin 74. When this is done, spring 52 tends to urge handle 38 from the position shown in FIGURE 2 toward the position shown in FIGURE 3. Owing to the fact that I mount the catch 60 independently of the handle 38, I may make the top 62 as wide as the handle, thus to facilitate actuation of the catch.

Shear pin 14 rides in a guide opening 76 in block 36 for movement from the retracted position shown in FIGURE 3 in which it is out of the opening 16 in the receptacle 18 to an extended position shown in FIGURE 2 wherein the shear pin is disposed in the recess 16. I form the upper surface 78 of the leading end of the pin 14 to provide a cam action as the pin moves into the recess so as to overcome any slight misalignment of the member 10 with respect to the body 12 before my latch is operated. As will be clear from the description given hereinafter, I so operate the pin 78 that the maximum thrust force is exerted on the pin 14 during its initial movement into the opening 16.

A stationary shaft 80 supported by the frame sides 20 and 22 receives the elongated hub 82 of a bell crank having respective arms 84 and 86. It will be clear that the hub 82 distributes the force applied to the pin 80 over the length thereof rather than applying it in a localized area. A slot 88 formed in the arm 86 receives a pin 90 extending across a slot 92 in the shear pin 14 to provide a driving connection between the arm 86 and the pin 14. A pivot pin 94 carried by the other bell crank arm 84 connects the arm to a pair of spaced legs 96 and 98 of a generally H-shaped connecting link 100. The other legs 102 and 104 of the link 100 carry a pin 106, the ends of which extend into arcuate slots 108 formed in the reinforcements 50 and in the respective flanges 42 and 44 of the handle 38. These slots 108 permit limited lost motion between the link 100 and the handle 38 for a reason which will be described hereinafter.

I so construct and arrange the parts of my assembly that in the open position of the handle shown in FIGURE 3, the longitudinal axis of the arm 86 is close to a position at which it is generally perpendicular to the path of movement of the pin 14.

In operation of my improved handle-operated shear pin latch, assuming that the member 10 such, for example, as a door is unlatched, it is moved into closed relationship with reference to the body 12. In this position of the member with relation to the body, shear pin 14 is at least approximately located with reference to the opening 16 in receptacle 18 to permit the latch to be operated.

Next, handle 38 is moved in a clockwise direction as viewed in FIGURE 3 toward the position shown in FIGURE 2. In the course of this movement, an end of slots 108 engages pin 106 to draw link 100 to the left as viewed in FIGURE 3. This movement of the link 100 produces a rotation of the bell crank arm 84 in a counterclockwise direction around the pivot 80. Arm 86 moves from its initial position adjacent a generally perpendicular position of the axis of the arm with respect to the path of movement of the shear pin 14. The movement of arm 86

exerts a thrust force on the pin 14 to cause it to enter the opening 16. Owing to the fact that the major component of the force exerted by arm 86 in the course of its initial movement is generally parallel to the path of movement of the shear pin, the thrust force on the pin will be a maximum. Thus, if there is a slight misalignment of the pin with respect to the opening 16, cam surface 78 will engage the edge of the opening and under the high thrust force will move the parts into alignment.

Handle 38 is moved further until the pin 74 engages the hooks 72 to cam the catch 60 in a clockwise direction against the action of spring 68 until the pin rides under the hooks 72 and the catch snaps back into place to hold the handle in its position wherein shear pin 14 is in its extended position within the opening 16 and the top 40 of the handle is flush with the surface of the member 10.

With the parts of the latch assembly in the position shown in FIGURE 2 in which the member 10 is secured to the body 12, when it is desired to release the latch, the catch 60 is actuated by the application of force to the area indicated by the arrow A to pivot the catch in a clockwise direction to move the hooks 72 away from the pin 74. Owing to the fact that the top 62 of catch 60 is substantially of the same width as the handle top 40, actuation of the catch is a relatively simple matter.

When the catch has been released, spring 52 urges handle 38 to move in a counterclockwise direction. The slots 108 permit a limited movement of about fifteen degrees of the handle 38 relative to the link 100 before movement of the handle is retarded by the frictional force between the shear pin 14 and the inner surface of the opening 16. This lost motion of the handle permits the operator to grasp the handle without difficulty and to move it to its fully open position at which the shear pin 14 is retracted so that the member 10 may be moved relative to the body 12.

It will be seen that I have accomplished the objects of my invention. I have provided a handle-operated shear pin latch in which the thrust force exerted on the shear pin is greatest during the initial movement of the pin from its retracted position. My assembly readily corrects any minor misalignment of the shear pin and its recetpacle. The actuatable surface of the catch of my latch is relatively large as compared with catches of the prior art to facilitate operation of the catch. I so construct my latch that the handle thereof is readily accessible upon release of the catch.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of my claims. It is further obvious that various changes may be made in details within the scope of my claims without departing from the spirit of my invention. It is, therefore, to be understood that my invention is not to be limited to the specific details shown and described.

I claim:

1. A latch assembly for use on a member having a surface formed with an opening, a shear pin, means mounting said shear pin for movement along a predetermined path between a retracted position and an extended position, an operating handle having a dimension corresponding to one dimension of said opening, means mounting said handle for movement between an open position extending out of said opening and a position in registry with said opening, a bell crank having a pair of arms, a fixed pivot mounting said bell crank for pivotal movement, means providing a positive two-way connection between one of said bell crank arms and said pin, a link connecting the other bell crank arm to said handle, said bell crank being so constructed and said link having a length such that said one bell crank arm occupies a position adjacent a position generally perpendicular to the path of movement of said shear pin in the open position of said handle and such that said one bell crank arm

occupies a position remote from said generally perpendicular position in the closed position of said handle, an actuatable catch for releasably holding said handle in its closed position, means mounting said catch with an area thereof in registry with said opening, said area having a dimension corresponding to said one dimension of said opening and means responsive to release of said catch for producing an initial movement of said handle out of said opening.

2. A latch assembly including in combination a shear pin, means mounting said shear pin for movement along a predetermined path between a retracted position and an extended position, a handle, means mounting said handle for movement from an open position to a closed position, a bell crank having a pair of arms, a fixed pivot mounting said bell crank for pivotal movement, means providing a positive two-way connection between one of said bell crank arms and said pin and a link connecting the other bell crank arm to said handle, said bell crank being so constructed and said link having a length such that said one bell crank arm occupies a position adjacent

a position generally perpendicular to the path of movement of said shear pin in the open position of said handle and such that said bell crank arm occupies a position remote from said generally perpendicular position in the closed position of said handle.

3. A latch assembly as in claim 2 in which said positive two-way connection is a lost motion connection.

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