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[54] LATCHING DEVICE

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[58] Field of Search 101/269; 220/55 R, 220/57, 59, 32, 33, 35; 292/297, 303, 304; 16/145, 146; 217/57 R, 60

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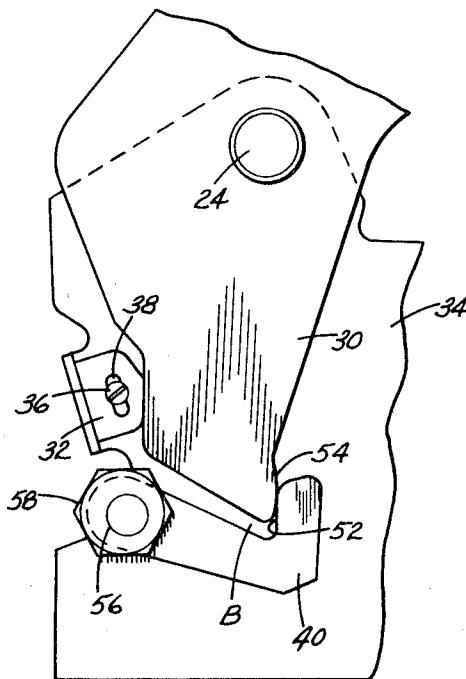
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[57] ABSTRACT

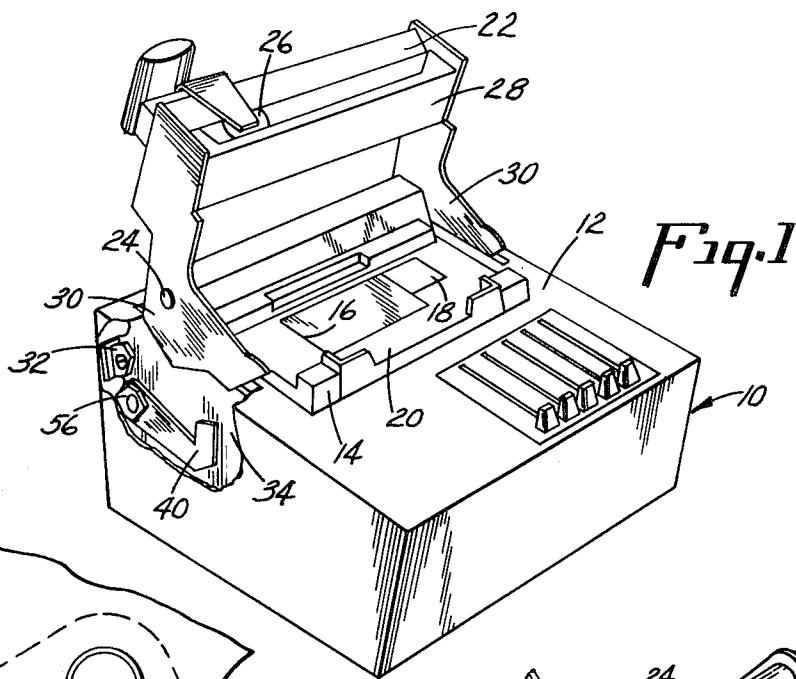
A latching device, particularly for latching a head in printing position on a bed in a data recorder. The latching device includes an adjustable stop to precisely position the head in the printing position, and cooperating latch means. The latch means include engagement surfaces and pivoted arms, which move into engagement with the engagement surfaces engaging them at a locking angle. The arms are positionable to insure clearance between the arms and the stop surfaces in the latching position.

3 Claims, 4 Drawing Figures



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LATCHING DEVICE

BACKGROUND OF THE INVENTION

This invention relates generally to data recorders, and more particularly to latching devices which will firmly latch two pivotally interconnected members of such recorder in a precisely adjustable predetermined position. This invention finds particular application in data recorders which are used for recording variable data onto forms.

In the art of data recording, a common device for recording variable data from printing tokens such as credit cards and variable print wheels is a device which comprises a printing bed and cover member pivoted thereon. The bed member is provided with the variable printing wheels, a slot to receive a credit card and a flat support surface on which is placed a form overlying the credit card and printing wheels. The cover member is pivotal between an open position to allow the form and credit cards to be inserted and removed and a closed or printing position wherein a roller platen is actuated to cause the characters on the credit card and printing wheels to be imprinted onto the form.

In the closed position it is desirable to cause as even a printing pressure as possible between the roller platen and the raised characters of the credit card and printing wheels, in order to provide uniform quality of printed characters on the form. One of the contributing factors to quality printing is that the path of the platen be as nearly parallel as possible to the support surface on which the form is supported.

It is therefore essential that when the cover member is closed to the desired printing position that it be maintained in this position during the printing operation without looseness.

While it is possible to design a cover member and bed member which will pivot to a precise closed position with the platen and the support surface parallel and to design a latch which will securely retain this precise position, nevertheless as a practical production matter manufacturing tolerances and inherent variations of parts preclude the actual manufacture of such precision devices. Further, wear and slippage during repeated use would tend to change this precise alignment after a period of use. The greater problem, however, is to produce interfitting latch and catch members which are snug, but can be easily separated in order to open the recorder.

SUMMARY OF THE INVENTION

According to the present invention a latch mechanism is provided which will allow two pivotally interconnected members to be precisely adjusted to a working position and firmly latched in that position to prevent movement upon application of reaction forces tending to move the members from the latched position.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view with parts broken away for clarity, showing a data recording device incorporating the latching mechanism of the present invention;

FIG. 2 is a perspective foreshortened view of the latching mechanism of the present invention in the opened position;

FIG. 3 is a perspective view similar to FIG. 2 of the latching mechanism of the present invention in the latched position; and

FIG. 4 is a detailed elevational view of one end component of the latching mechanism of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

10 Referring now to the drawing and for the present to FIG. 1, a data recorder generally designated as 10 is shown which incorporates the latching mechanism of the present invention. The data recorder 10 includes a conventional bed member 12 which has a raised platform 14 thereon. The platform 14 includes a receiving slot 16 adapted to receive and support a printing token, frequently referred to as a card. Such cards have raised printing characters thereon. The platform includes a print wheel opening 18 through which the characters 15 on variable print wheels project. The platform has a surface 20 which is disposed to support a form in overlying relationship with the credit card in the slot 16 and the print wheels in the opening 18.

A cover member 22 is provided which is pivotally mounted to the bed member 12 on a shaft 24. The cover member 22 includes a conventional roller platen 26 and form holding shield 28.

The cover member 22 is pivotally mounted to swing between an open position which is shown in FIG. 1 and a closed or printing position wherein the shield 28 overlies the top of the form disposed on the support surface 20.

30 The cover member 22 is provided with a pair of depending side plates 30. The rear surface of each side plate is disposed to abut against one of a pair of stop lugs 32, one of which is shown in FIG. 1. Each of the stop lugs 32 is mounted to a portion of a frame 34 by means of a screw 36 extending through a slot 38 formed in the stop lug 32. As can best be seen in FIG. 35 4 by slidably positioning the stop lug 32 on the screw 36 the position at which the rear surface of the side plate 30 strikes its respective lug will be changed, thereby changing the closed position of the cover member 22 with respect to the bed member. By properly adjusting the positions at which the side plates 30 strike the stop lugs 32 the closed position of the cover member can be precisely adjusted to give the exact desired relationship between the shield 28 and the support surface 20. Thus the manufacture and assembly of the 40 cover member with respect to the bed member need not be precise, but rather can be precisely adjusted even with wide manufacturing tolerances after the machine has been assembled.

50 55 To latch the cover member in the precisely selected position and hold it tightly in this position against the reaction forces generated by the printing operation of the platen, a pair of "L" shaped latching arms 40 are provided, each of which cooperates with one of the side plates 30 of the cover member. As can best be seen in FIG. 2, the latching arms 40 are mounted at the opposite ends of a shaft 42. The shaft 42 is provided with biasing means which is illustrated in the form of a torsion spring 46. The spring 46 is positioned to urge the shaft 42 to rotate in a counterclockwise direction (as viewed 60 in FIGS. 2 and 3) thus urging the latching arms 40 toward engagement with the side plates 30 when the cover is in the closed position.

A pair of cams 48 and 50 are provided on the shafts 24 and 42 respectively which will maintain the latching arms 40 in a ready position when the cover is open, as shown in FIG. 2, but which will disengage from each other and allow the latching arms 40 to move into latching engagement with the side plates 30 when the cover is in the closed position, as shown in FIG. 3.

As can best be seen in FIG. 4, when the latching arm 40 moves into latching engagement with the side plates 30 (only one need be described, since the other is identical) the latching arm 40 has a first engagement surface 52 which moves into engagement with a second engagement surface 54 formed on the side plate 30. This engagement takes place by virtue of the spring 46 urging the arm 40 in a counterclockwise direction as shown in FIG. 2 until the engagement surfaces 52 and 54 come into contact with each other. Preferably one of the surfaces, (in the disclosed embodiment the second engagement surface) is slightly arcuate in shape. This allows for more of a range of engagement between the surfaces. Further, the engagement of the surfaces 52 and 54 must be at a locking angle so that the reaction forces of the side plate against the arm will not pivot the arm out of engagement but will actually lock the surfaces against each other. This locking angle is related to the position of engagement of the surfaces and the axes of rotation of the arms and the side plates since this is a well known phenomenon, it is not believed that it is necessary to discuss this angle in detail, other than to say that this angle varies with various materials, but usually is less than about 5 to 7 degrees.

Due to the latching engagement of the head and bed members, it can be easily understood that some method of unlatching these members is necessary. A simple, but straight forward solution would involve physically exerting a force in a downward direction, such as with a finger, on the latching arm 40. Although it is not shown in the figures, the method used in the preferred embodiment includes a cam and follower which engages to exert a rotative force on shaft 42 releasing the latching arms after the imprinting stroke has been completed and the roller platen is being returned to its original position.

As can be seen from FIG. 4, there is a clearance space between the bottom of the side plate 30 and the top of the latching arm 40, which clearance space is designated by the reference character "B" in FIG. 4. It is necessary that there be this clearance space in the latched position in order to assure a firm latching of the type which will not allow any play or movement of the cover in the latched position. It will be readily appreciated that if the arm 40 were to strike the bottom of the side plate before the engagement surfaces 52 and 54 were to come into engagement there would be a certain amount of play or movement possible between the cover member and the bed member. Hence if printing pressure were exerted by a movement of the platen, the cover member would tend to lift and tilt to the extent

that such movement or play would thus cause an uneven pressure distribution across the printing surface. Thus, it is essential that there be clearance between the bottom of the side plate 30 and the latching arm 40.

In order to insure that this clearance will be present in all of the devices irrespective of manufacturing tolerances and even if the relationships of the cover member and bed member change during repeated use, the shaft 42 is mounted at each end in an eccentric collar, one of which is shown at 56, in FIG. 4. The eccentric collar is secured by means of a nut 58 and the nut can be loosened and the eccentric collar turned to raise or lower the shaft to provide proper clearance between the bottom of the side plates 30 and the arms 40.

Thus, the present invention provides cooperating stop means and latching members which allow for a precise adjustment of a given relative position of the two members with latching possible at the precisely adjusted position without play or movement.

What is claimed is:

1. A data recorder having a base and a pivotally supported head; a swingable arm carried by said head and movable therewith in a path; an abutment stop device located in said path; means for adjusting said stop device to a selected location within a predetermined range for restraining the movement of said pivoting head at a desired closed position of said head; said arm having a smoothly curved surface positioned with respect to said path in a frontal location upon opening pivotal swing of said arm; and a latching arm carried by said base and having a lock surface, said latching arm swingable about a pivotal center to move said lock surface in an interference path crossing said path of the arm, said lock surface coming to rest against said smoothly curved surface of said swingable arm at a point within a range over said smoothly curved surface determined by the selected setting of said abutment stop device, said lock surface and the path thereof having an angular relationship with respect to said arm latch surface when mutually engaged such that a force generated by an attempted reversal of said head will fail to create a force component in said latching arm sufficient to move said latching arm to an unlatching position.

2. A data recorder having a base and a pivotally supported head as defined in claim 1 wherein said latching arm has a smoothly curved lock surface.

3. A data recorder as defined in claim 1 wherein a biasing means and cam device are arranged to maintain said latching arm in a position to accept engagement when said pivotal member is in an open position and under a restraining pressure when said pivotal member is in a closed position.

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