

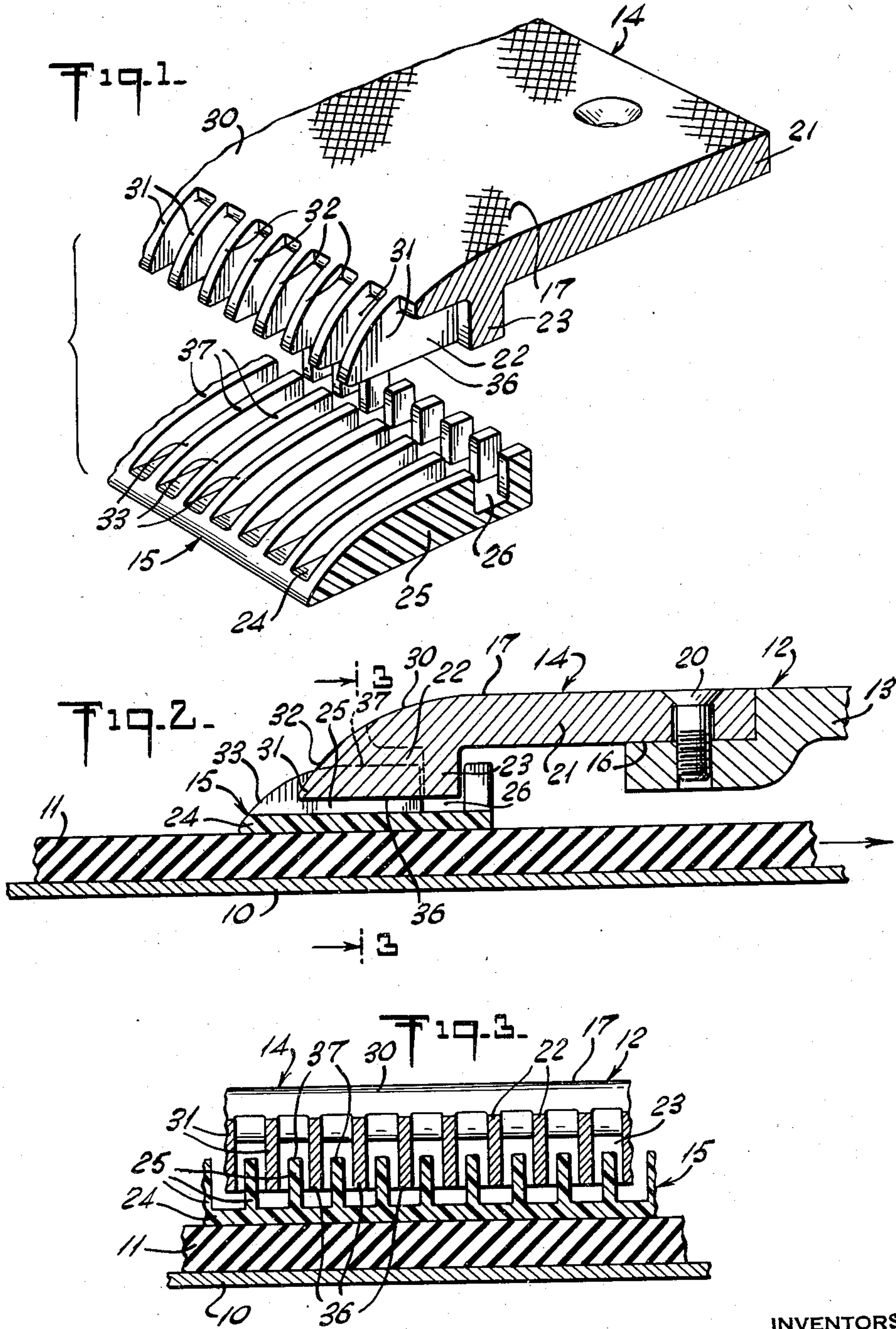
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GUARD DEVICES FOR THE LANDINGS OF BELT CONVEYORS

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## GUARD DEVICES FOR THE LANDINGS OF BELT CONVEYORS

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The present invention relates to a guard device for passenger conveyors and relates, more particularly, to a guard device for closing the gap between the surface of a moving conveyor and a landing onto which people are discharged from the conveyor.

In a conveyor of the type referred to, a belt or other suitable transport media continuously moves at a speed such, that the passengers can step on and off at loading and discharge points. In such a conveyor, the belt ordinarily passes beneath a fixed plate-like landing at the discharge point and the clearance or gap between the upper surface of the belt and the fixed landing may vary within considerable limits for a number of reasons. For example, such variation in the clearance may be due to undulations in the belt as it moves; or the belt may vary in thickness; or there may be irregularities in the various components of the conveyor system. Because of these variations, it is difficult to close such a gap effectively, but if it is not closed clothes, shoes and other articles may be accidentally caught between the belt and the landing causing injury to the passenger and possible damage to the conveyor system. Since such conveyors are generally installed in public places, it is highly important that any risk of damage or injury to the passengers or a breakdown of the conveyor be reduced to a minimum.

One object of the present invention is to provide a new and improved protective device at the entry end of the landing which prevents any article from catching or being drawn between the belt and the landing without interfering with the free movement of the belt, which automatically compensates for variations in the position of the belt surface in the region of the entry end of the landing, which is attractive but at the same time is almost unobtrusive, and which affords smooth transition of the passengers as they disembark from the belt and step onto the landing.

As a feature of the present invention, there is provided a floating guard nib between the belt and the landing at the entry end of the landing, resting on the belt by its own weight, so that it rises and falls with the belt as required, to accommodate for slight unevenness in the height of the moving belt. Although this floating guard nib is free to rise and fall with the belt in relation to the fixed landing, it is held against movement with the belt in its direction of travel. As a further feature, the entry end of the landing has a series of depending ribs on its lower side, and the guard nib has a series of upstanding ribs meshing with said depending ribs and cooperating therewith by their overlapping relationship to block entry of articles between the landing and the belt. The two series of ribs remain intermeshed and overlapping between the belt and the landing, even though the belt surface should fluctuate, and these ribs are extended lengthwise of the belt to afford smooth streamlined transition of passengers between the belt and the landing.

Various other objects, features and advantages of the

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invention are apparent from the following description and from the accompanying drawings, in which

Fig. 1 is an exploded perspective view showing a nose piece at the entry end of the landing and a floating guard nib adapted to cooperate with the nose piece to form therewith a guard device constituting an embodiment of the present invention;

Fig. 2 is a transverse section of part of the passenger conveyor system near the entry end of the landing and showing in assembly an embodiment of the guard features of the present invention; and

Fig. 3 is a transverse section of the assembly of Fig. 2 taken along the lines 3—3 of Fig. 2.

Patent 2,850,149 illustrates the general type of passenger conveyor system to which the protective features of the invention may be applied. In this system, there is provided a plurality of platform members arranged in succession, each platform member being wheel-supported at one end and supported at its other end by a swivel connection with the wheeled end of the adjacent platform member. In this manner, the platform members are coupled together to form an endless train which is suitably guided and wheeled along a trackway. The conveyor can be driven at one or more points by drives, each of which may comprise a motor driving a sprocket and chain through a reduction gearing. This chain carries along its length dogs having drive connections with the inner sides of the platform members. The drawing shows one of these platform members 10.

In the general type of passenger conveyor system described, the entire top surfaces of all the platform members 10 and the spaces between them are covered by a transport member 11 shown in the form of an elastic belt of rubber or other elastomeric material presenting a continuous surface on which the passengers stand and by which they are conveyed. This is a non-working belt in the sense that it is not subjected to the conveyor drive tension, its primary function being simply to furnish a smooth comfortable surface on which the passengers are transported.

The drawing shows for purpose of illustration only one discharge station for the conveyor. At this station, there is provided directly over the belt 11 a fixed plate-like landing 12 desirably made of metal; the belt travels towards and underneath the landing.

As an important feature of the present invention, in order to close the gap between the landing 12 and the belt 11, the landing comprises a plate 13 and a nose piece 14 connected to the entry end of the plate and cooperating with a floating guard nib 15. For mounting the nose piece 14 at the entry end of the landing plate 13, said landing plate has a recess 16 at its rear end, and the forward end of the nose piece fits into said recess as in a rabbet joint and has its top surface flush with the top surface of the landing plate. The top surface of the nose piece 14 has a tread 17 thereon to present an anti-skid surface and the upper surface of the landing plate 13 may also be provided with a tread. A series of studs 20 connect the nose piece 14 to the landing plate 13.

The nose piece 14 comprises a plate 21 having integral therewith at its entry end a series of spaced parallel longitudinal depending ribs 22 extending in the direction of travel of the belt and all merging into a transverse rib 23 on the underside of said plate 21 integral with said plate. The transverse rib 23 not only imparts transverse rigidity to the nose piece 14 but also serves as a key by which the guard nib 15 is held against movement along the belt 11, while being permitted to move up and down with the upper surface of the belt relative to the nose piece, as will be described more fully.

The floating guard nib 15 comprises a flat base plate 24 resting on the belt 11 and having on its upper side a



series of longitudinal ribs 25 integral therewith and extending along the direction of travel of the belt. These longitudinal ribs 25 are spaced to correspond to the spacing between the ribs 22 on the nose piece 14 and mesh loosely with the ribs 22. Near their forward ends, the ribs 25 are provided with a transverse groove 26 serving as a keyway into which extends the transverse key rib 23 of the nose piece 14 with a fit which is somewhat snug but which is nevertheless loose enough to permit the nib to move freely up and down in loose mesh with the nose piece following the up and down movement of the top surface of the belt 11 while remaining keyed to the nose piece.

The rear end surface 30 of the plate 21 of the nose piece 14 is curved convexly rearwardly and downwardly towards the surface of the belt and the ribs 22 thereof project rearwardly beyond said plate to define respective fingers 31. The upper edges 32 of these fingers 31 are curved convexly rearwardly and downwardly towards the upper surface of the belt 11 to follow the curvature of said plate surface 30, so that the surface 30 and rib edges 32 are in continuous relationship. The resulting streamlining of the nose piece 14 supplemented by the streamlining of the guard nib 15 in the manner to be described, permits easy transition of the passengers from the belt 11 to the landing 12 without tripping.

The guard nib 15 projects rearwardly beyond the nose piece 14 and the upper edges 33 of the ribs 25 on said guard nib near the rear ends of the ribs are convexly curved upwardly and forwardly from the base plate 24 of the nib. Although the outlines of the two convex rib edges 32 and 33 of the nose piece 14 and guard nib 15 are not continuously joined, they do conjointly define a contoured stepped threshold between the belt 11 and the landing 12 which is safe and free from sharp projection on which passengers may trip. Also, the arrangement is such as to render almost unobtrusive the nose piece 14 and the guard nib 15 and whatever parts of the nib or nose piece are apparent are attractive in appearance.

The guard nib 15 extends substantially across the full effective width of the belt and is constructed to retain flexibility in a direction transverse to the direction of belt travel where it is needed, while at the same time, it is stiffened in the direction of belt travel by the ribs 25. The guard nib 15 will, therefore, yield transversely with the belt 11 when a passenger steps on said guard nib in disembarking from the belt. A suitable material from which the guard nib 15 is made to impart the necessary flexibility thereto is Teflon (tetrafluoroethylene resin), although other suitable plastics may be employed. The plastic construction of the guard nib 15 not only imparts flexibility to the nib but also gives it resiliency, so that it will return to its original position when relieved of a standing load.

The nose piece 14 and the guard nib 15 are designed, so that the lower edges 36 of the ribs 22 on the nose piece are parallel to and spaced from the upper side of the base plate 24 of the guard nib 15 and the upper edge 37 of the ribs 25 on the guard nib forward of their rear curved edges 33 are spaced below the underside of the plate 21 of the nose piece, even when the guard nib 15 is raised to the limit of its uppermost position attained during operation, so that the guard nib 15 floats up and down with the upper surface of the belt 11 through the full range of possible movements in operations. The two series of ribs 22 and 25 through this range of possible movement remain in overlapping meshed relationship, so that they block entry of any article between the landing 12 and the belt 11 regardless of the level of the upper surface of the belt 11.

While the invention has been described with particular reference to specific embodiment, it is to be understood that it is not to be limited thereto but is to be construed

broadly and restricted solely by the scope of the appended claims.

What is claimed is:

1. In a passenger conveyor having a fixed landing and a transport member adapted to travel towards and underneath said landing, a guard device for closing the gap between the transport member and the landing comprising a floating guard nib seated on said transport member and extending underneath said landing and across substantially the full effective standing width of the transport member, said guard nib being supported entirely on said transport member, and means holding said guard nib against movement with the transport member while permitting said guard nib to float up and down with the upper surface of said transport member.

2. In a passenger conveyor having a fixed landing and a transport member adapted to travel towards and underneath said landing, a guard device as described in claim 1, wherein said guard nib projects rearwardly beyond the entry end of said landing and has its upper side curving convexly downwardly and rearwardly towards the upper surface of the transport member on which said guard nib rests to define a streamlined threshold for said landing.

3. In a passenger conveyor having a fixed landing and a transport member adapted to travel towards and underneath said landing, a guard device as described in claim 1, said guard nib projecting rearwardly beyond the entry end of said landing and having its upper side curving convexly downwardly and rearwardly towards the upper surface of the transport member on which said guard nib rests, the entry end of said landing having its upper surface curving convexly downwardly and rearwardly towards the upper surface of the transport member, whereby the guard device and the entry end of the landing conjointly define a streamlined threshold for the landing.

4. In a passenger belt conveyor having a fixed landing and a transport belt adapted to travel towards and underneath said landing, a guard device as described in claim 1, wherein the means holding said guard nib against movement with the belt comprises a loose key connection between said guard nib and said landing.

5. In a passenger belt conveyor having a fixed landing and a transport belt adapted to travel towards and underneath said landing, a guard device for closing the gap between the belt and the landing comprising a floating guard nib seated on said belt and extending underneath said landing and across substantially the full effective standing width of the belt, said guard nib being supported entirely on said belt, said landing near its entry end having on its underside a series of spaced ribs extending longitudinally in the direction of travel of the belt, said guard nib having on its upper side a series of ribs extending longitudinally in the direction of travel of the belt and spaced to correspond to the spacing of the ribs on the landing, the two series of ribs loosely meshing and overlapping through the full range of possible up and down movement of the guard nib in operation, and means holding said guard nib against movement with the belt while permitting said guard nib to float up and down with the upper surface of said belt while in mesh with the landing.

6. In a passenger belt conveyor having a fixed landing and a transport belt adapted to travel towards and underneath said landing, a guard device as described in claim 5, wherein said holding means comprises a loose key connection between said guard nib and said landing.

7. In a passenger belt conveyor having a fixed landing and a transport belt adapted to travel towards and underneath said landing, a guard device as described in claim 5, said holding means comprising a transverse key rib on the underside of the landing into which the longitudinal ribs of said landing merge, said guard nib having



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a transverse groove loosely receiving said transverse rib to serve as a keyway.

8. In a passenger belt conveyor having a fixed landing and a transport belt adapted to travel towards and underneath said landing, a guard device as described in claim 5, said landing comprising a plate and a separate nose piece connected to the entry end of said plate and presenting an upper surface flush with the upper surface of said plate, the longitudinal ribs on the landing being on said nose piece.

9. In a passenger belt conveyor having a fixed landing and a transport belt adapted to travel towards and underneath said landing, a guard device as described in claim 5, said landing comprising a plate and a separate nose piece connected to the entry end of said plate and presenting an upper surface flush with the upper surface of said plate, the longitudinal ribs on the landing being on said nose piece, said holding means comprising a transverse key rib on the underside of the landing, said guard nib having a transverse groove loosely receiving said transverse rib to serve as a keyway.

10. In a passenger belt conveyor having a fixed landing and a transport belt adapted to travel towards and underneath said landing, a guard device as described in claim 5, said guard nib projecting rearwardly beyond the entry end of said landing and having the upper edges of its projecting longitudinal ribs curved convexly downwardly

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and rearwardly towards the upper surface of the belt on which said guard nib rests, the entry end of the landing comprising a plate from which the longitudinal ribs on the landing depend, the latter ribs projecting rearwardly from said plate to define respective fingers, the upper edges of said fingers being curved convexly downwardly and rearwardly towards the upper surface of the belt, whereby the guard nib and the entry end of the landing conjointly define a streamlined threshold for the landing.

11. In a passenger conveyor having a fixed landing and a transport member adapted to travel towards and underneath said landing, a guard device as described in claim 1, wherein said guard nib projects rearwardly beyond the entry end of said landing and has traverse resiliency and longitudinal rigidity.

12. In a passenger conveyor having a fixed landing and a transport member adapted to travel towards and underneath said landing, a guard device as described in claim 11, wherein said guard nib is made of resilient plastic material.

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