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Pull-through seal

The present invention relates to a pull-through seal according to the generic term of claim 1 as well as a
5 method for the production of the same.

Pull-through seals, whereas a strap or strip provided with engaging means is pushed through a receiving opening arranged at one end of the strap or strip and is deterred from being pulled out by retaining means arranged in the
10 receiving opening, are known for instance from WO 95/27968. A seal is shown there among other things with a planar base plate with a push through opening arranged perpendicularly to the surface. An enlacement body in form of a plane tongue or slip is arranged directly at the base plate
15 perpendicular with respect to the push through direction. The end of this tongue may now be inserted and pushed through in one direction into the push through opening. Thereby a loop is created with its dimension or diameter respectively being influenced by the amount of the push
20 through length. This loop will be smaller with increasing push through length. The tongue has to be disrupted for the opening of the loop, as the retaining means in the push through opening will prevent a pushing back of the tongue.

To complicate a tampering attempt of the seal it is
25 foreseen that the retaining means are arranged transverse to the push through direction of the tongue at the seal within an accordingly accomplished housing. That is to prevent the tear-out and subsequent re-insertion of the

retaining means which are commonly inserted in an opening arranged in the push through direction of the housing.

This solution features the disadvantage of a complicate build up of the housing and further the insertion of the retaining means is associated with additional effort especially for high volume manufacturing. If a flat tongue is used instead of the represented tongue with retaining elements, such a tongue will break under tensile loading at the same place as set forth below with the same disadvantages.

Furthermore, such pull-through security seals are known having a tongue consisting of a flat strap with rectangular or barbell shaped cross section. Such tongues may be pulled through the push through opening into any suitable position, i.e. the diameter of the loop built up by the seal is continuously variable adjustable in contrary to the known solutions with engaging means as for instance in form of grooves.

The object of the present invention was to find a continuously variable adjustable pull-through seal, which is easy to manufacture.

This object is solved inventively with a pull-through seal with the characteristics of claim 1. Preferred embodiments arises from the characteristics of the dependent claims 2 to 9.

The riveting of the cover of the retaining element with the seal body by rivet cylinders protruding from the base plate and lead through the cover causes a reliable and secure closing of the retaining element. The manufacturing process

and especially the closing process may be shortened by the small dimensions of the rivets or rivet cylinders respectively.

The rivet heads further features preferably a regularly
5 curved form to the outside. Thus any tampering effort will be readily identifiable, for instance the attempt to open the cover by removing the rivet heads.

Such a seal will inventively be manufactured by the method according claim 10.

10 An embodiment example of the inventive pull-through seal will be described following in details according the figures of the attached drawings. It is shown in

15 Fig. 1 the oversight onto the lower side of a inventively seal;

Fig. 2 the side view of the seal of figure 1; and

Fig. 3 the longitudinal cross sectional view through the retaining part of the seal of figure 1.

20 Figure 1 shows the oversight onto the lower side of a inventively shaped pull-through seal with a base plate 1, protruding tongue 2 and a housing part 3 with a pull-through opening 3'.

According the side view of figure 2, a slip 4 is arranged
25 to the left side, which may be used for labeling and on which the seal may be held stable. The end of tongue 2 will be introduced into the pull-through opening 3' in the

direction indicated by the flesh, thereby building up a closed loop.

A retaining element 5 is now arranged in the housing part 3, here for instance in form of a metallic insert with tips 5' bent under an acute angle into the pull-through direction, as set forth in the longitudinal cross-sectional view of figure 3. If the end of tongue 2 is now inserted into the pull-through opening 3' within the pull-through direction and then pushed through, the tips of the metallic insert 5 will be elastically bent up by the tongue 2. While attempting of pulling back tongue 2, the tips of the metallic insert 5 will engage into the surface of tongue 2 under an acute angle and thereby blocking any movement contrary to the pull-through direction. Therefore, it is only possible to move the tongue 2 in direction of the pull-through direction and thereby scaling down the loop built by the tongue 2 and the base plate 1. This scaling down may now be effectuated continuously variable, as the metallic insert 5 does not engage into definite displaced crimps but may engage at each discretionary position onto the flat surface of tongue 2.

A covering plate 6 is arranged below the retaining element 5 deployed within the housing part 3, matching exactly into the opening of the housing part 3. The covering plate 6 comprises cams 7 protruding to the upside, which engages against the retaining element 5 and thereby pressing this element against the corresponding upper surface of the housing part 3. The retaining element 5 will thereby be hold in this position within the housing part 3. The

retaining element 5 may thereby either be clamped or pressed respectively without tolerance, or hold with small tolerance in this room.

The fastening of the covering plate 6 with the housing part 3 is realized inventively with rivets 8. The cylinders 8' of the rivets 8 are built up preferably directly from the material of the housing part 3, or respectively protrude collateral to the opening of the housing part 3 down in direction of the covering plate 6. Openings for the leading-through of the rivet cylinders 8' are disposed in the covering plate 6, that is after the insertion of the retaining element 5 the covering plate 6 may be inserted into the housing part 3 over the rivet cylinders 8' during the manufacturing of the seal. The rivet heads 8'' may be built up subsequently, preferably under the influence of heat, and thereby connecting the covering plate 6 reliably with the housing part 3 of the seal. The rivet heads 8'' thereby exposing favorably a regularly curve shaped form.

A preferred embodiment of the arrangement of the rivets 8 is well apparent from figure 1, whereby in the edge of the covering plate 6 a great rivet 8 and in the border areas two smaller rivets 8 are arranged respectively.

The openings in the underside of the covering plate 6 may additionally be widened or beveled to provide notably regular shaped rivet heads 8' and to build up a notably secure and strong connection between the covering plate 6 and the housing part 3.

It is not possible to remove the tongue 2 out of the housing part 3 without any visible destruction of the seal,

whereby any possible tampering may immediately be
recognized. The inventive construction may be manufactured
easily, rapidly and inexpensively and is therefore notably
suited for a cost saving high volume manufacturing of pull-
5 through seals.

claims

1. Pull-through seal with a base plate (1) and a tongue
(2) protruding thereof and a housing part (3) arranged on
5 the base plate (1) and having a pull-through opening (3'),
with inside arranged retaining elements (5) for the tongue
(2), whereby the housing part (3) is closed by a covering
plate (6), characterized in that the covering plate (6) is
connected to the housing part (3) with rivets (8).

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2. Pull-through seal according claim 1, characterized in
that the rivets (8) are disposed at the inside of the
housing part (3) and connected with the housing part (3),
and that the ends of the rivet cylinders (8') are led
15 through openings disposed in the covering plate (6).

3. Pull-through seal according claim 1 or 2,
characterized in that the rivets (8) are directly built
from the material of the housing part (3).

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4. Pull-through seal according to on of claims 2 or 3,
characterized in that the openings in the covering plate
(6) are disposed to the outside with widened diameter or
beveled.

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5. Pull-through seal according to one of claims 1 to 4, characterized in that the rivet heads (8'') are regularly curved shaped.

5 6. Pull-through seal according to one of claims 1 to 5, characterized in that the covering plate (6) is provided with cams (7) facing to the inside, for engaging against the retaining means (5).

10 7. Pull-through seal according to one of claims 1 to 6, characterized in that the base plate (1), the tongue (2), the housing part (3) and the rivets (8) are made of one piece, preferably made out of plastic.

15 8. Pull-through seal according to one of claims 1 to 7, characterized in that the retaining elements (5) are disposed of pointed elements, tooth-formed at their ends, which protrudes into the pull-through opening (3') in an acute angle contrary to the pull-through direction.

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9. Pull-through seal according to claim 8, characterized in that the retaining elements (5) are made of metal.

10. Method of manufacturing of a pull-through seal
25 according to one of claims 1 to 9, characterized in that the covering plate (6) is connected to the housing part (3)

with rivets (8), preferably with rivets (8) built up directly from the material of the housing.