the inner tube 5 and the outer tube 3 as a solution for realizing a hydrostatic pressure-resistant covering for a pipeline provided with thermal insulation. This solution is very laborious and in various practical situations undesired and/or impossible.

It is an object of the invention to provide at least an alternative solution according to which the envelope elements are prevented from coming loose with respect to the pipeline, which alternative solution is at least efficient and reliable.

According to a first aspect of the present invention, there is provided a plastic envelope element for an underwater pipeline, configured for, in fitted condition, at least partly enveloping the pipeline, wherein the envelope element is modular for forming a tube around the pipeline with similar such envelope elements linked up in the circumferential direction (T) of the pipeline in their fitted conditions, the envelope element comprising an inner side which in the fitted condition faces the pipeline and an outer side which in the fitted condition faces away from the pipeline, and further comprising at least one local spring portion manufactured integrally with the envelope element, which with respect to remaining portions of the envelope element located next to the spring portion functions as a local spring and is deformable under its spring force from a relaxed condition of the spring portion to a tensioned condition of the spring portion, and vice versa, wherein: the relaxed condition occurs at least in a not yet fitted condition of the envelope element, and in the relaxed condition the spring portion projects at least partly on the inner side of the envelope element; and the tensioned condition occurs at least in the fitted condition of the envelope element, and in the tensioned condition the spring portion does not project or projects to a lesser extent than in the relaxed condition on the inner side of the envelope element such that the spring portion in the fitted condition presses under its said spring force against the pipeline; **characterized in that** the spring portion is at least formed by a wall portion of the envelope element projecting in the relaxed condition on the inner

side of the envelope element, which projecting wall portion is resiliently hingeable with respect to said remaining portions of the envelope element located next to the spring portion, while said projecting wall portion extends bridgingly between two mutually parallel and mutually spaced hinge edges of said projecting wall portion, and wherein the projecting wall portion is resiliently hingeable about both said hinge edges simultaneously with respect to said remaining portions of the envelope element located next to the spring portion, wherein at least a portion of other edges, not being the two said hinge edges, of the projecting wall portion does not adjoin said remaining portions of the envelope element located next to the spring portion, in a manner such that between the non-adjoining portion of these other edges, on one side, and said remaining portions of the envelope element located next to the spring portion, on the other, in the relaxed condition at least one passage is formed in the envelope element.

According to a second aspect of the present invention, there is provided an assembly of an underwater pipeline and several envelope elements according to the above description, which envelope elements in their fitted conditions form a covering tube around the pipeline in that they are linked up in the circumferential direction (T) of the pipeline.

According to a third aspect of the present invention, there is provided a mold, especially designed for manufacturing an envelope element according to the above description.

According to a fourth aspect of the present invention, there is provided a method for covering a pipeline with envelope elements according to the above description, comprising: above water forming a cover tube around the pipeline by bringing several similar such envelope elements linked together in the circumferential direction (T) of the pipeline in their fitted conditions; and sinking under water the pipeline with the cover tube formed therearound.

In view of the above~~To this end~~, the invention provides a plastic envelope element according to the accompanying claim 1, an associated mold according to the accompanying claim 14, and a method according to the accompanying claim 15. More specific embodiments of the invention are laid down in the accompanying dependent claims 2 through 13 and 16.

The envelope element according to the invention is modular for forming a tube around the pipeline with similar such envelope elements linked up in circumferential direction of the pipeline in their fitted conditions. Through such a modularity, the envelope element, including the at least one spring portion manufactured integrally therewith, can have a withdrawable form, so that it can be manufactured in a simple and inexpensive manner, for instance with an appropriate mold in an injection molding process. Such a modularity further offers the advantage that in various practical situations the envelope elements can be fitted around the pipeline in a simple manner. This in contrast to an alternative envelope element which is already tubular in itself. Such an alternative envelope element can in fact be fitted around a pipeline only by sliding the alternative element axially over an end of the pipeline.

The envelope elements according to the invention can above water be arranged around the pipeline with a tight fit. The at least one local spring portion, manufactured integrally with the envelope element, of a thus fitted envelope element is then in tensioned condition. In this tensioned condition,

Claims

1. A plastic envelope element for an underwater pipeline ~~(2)~~, configured for, in fitted condition, at least partly enveloping the pipeline, wherein the envelope element is modular for forming a tube around the pipeline with similar such envelope elements linked up in the circumferential direction (T) of the pipeline in their fitted conditions,

the envelope element comprising an inner side ~~(3)~~ which in the fitted condition faces the pipeline and an outer side ~~(4)~~ which in the fitted condition faces away from the pipeline, and further comprising at least one local spring portion ~~(5, 6)~~ manufactured integrally with the envelope element ~~(1)~~, which with respect to remaining portions ~~(9)~~ of the envelope element located next to the spring portion functions as a local spring and is deformable under its spring force from a relaxed condition of the spring portion to a tensioned condition of the spring portion, and vice versa, wherein:

- the relaxed condition occurs at least in a not yet fitted condition of the envelope element, and in the relaxed condition the spring portion projects at least partly on the inner side of the envelope element; and
- the tensioned condition occurs at least in the fitted condition of the envelope element, and in the tensioned condition the spring portion does not project or projects to a lesser extent than in the relaxed condition on the inner side of the envelope element such that the spring portion in the fitted condition presses under its said spring force against the pipeline;

characterized in that the spring portion ~~(5, 6)~~ is at least formed by a wall portion ~~(8)~~ of the envelope element projecting in the relaxed condition on the inner side ~~(3)~~ of the envelope element, which projecting wall portion is resiliently hingeable with respect to said remaining portions ~~(9)~~ of the envelope element located next to the spring portion, while said projecting wall portion ~~(8)~~ extends bridgingly between two mutually parallel and mutually

spaced hinge edges ~~(10, 11)~~ of said projecting wall portion, and wherein the projecting wall portion is resiliently hingeable about both said hinge edges simultaneously with respect to said remaining portions ~~(9)~~ of the envelope element located next to the spring portion, wherein at least a portion of other edges ~~(14, 15)~~, not being the two said hinge edges ~~(10, 11)~~, of the projecting wall portion ~~(8)~~ does not adjoin said remaining portions ~~(9)~~ of the envelope element located next to the spring portion, in a manner such that between the non-adjoining portion of these other edges ~~(14, 15)~~, on one side, and said remaining portions ~~(9)~~ of the envelope element located next to the spring portion, on the other, in the relaxed condition at least one passage ~~(16)~~ is formed in the envelope element.

2. An envelope element according to claim 1, wherein the at least one spring portion ~~(5, 6)~~ is manufactured integrally with the envelope element ~~(1)~~ in an injection molding process, wherein the at least one passage ~~(16)~~ is formed in said injection molding process.

3. An envelope element according to claim 1 or 2, wherein the envelope element ~~(1)~~ is modular for linking up in longitudinal direction (L) of the pipeline ~~(2)~~ similar such envelope elements in their fitted conditions.

4. An envelope element according to any one of the preceding claims, further comprising at least one projection ~~(7)~~ on the outer side ~~(4)~~ of the envelope element ~~(1)~~ for, in the fitted condition, in which the pipeline ~~(2)~~ is in a flowing fluid, suppressing vibrations of the pipeline which are induced by vortices of the flowing fluid occurring on a downstream side of the pipeline.

5. An envelope element according to any one of the preceding claims, comprising a first plurality of such spring portions ~~(5, 6)~~ which, viewed in the

fitted condition, are situated at a distance from each other at least in longitudinal direction (L) of the pipeline ~~(2)~~.

6. An envelope element according to any one of the preceding claims, comprising a second plurality of such spring portions ~~(5, 6)~~ which, viewed in the fitted condition, are situated at a distance from each other at least in circumferential direction (T) of the pipeline ~~(2)~~.

7. An envelope element according to claim 6, wherein the spring portions ~~(5, 6)~~ of said second plurality, viewed in circumferential direction (T) taken perpendicularly to the longitudinal direction (L) of the pipeline ~~(2)~~, are mutually in line.

8. An envelope element according to claim 7, comprising at least two such second pluralities, which second pluralities are situated at a distance from each other in longitudinal direction (L) of the pipeline ~~(2)~~.

9. An envelope element according to any one of the preceding claims, wherein the two mutually parallel and mutually spaced hinge edges ~~(10, 11)~~ of said projecting wall portion ~~(8)~~, viewed in the fitted condition, are parallel to the longitudinal direction (L) of the pipeline ~~(2)~~.

10. An assembly of an underwater pipeline ~~(2)~~ and several envelope elements ~~(1)~~ according to any one of the preceding claims, which envelope elements in their fitted conditions form a covering tube around the pipeline in that they are linked up in the circumferential direction (T) of the pipeline.

11. An assembly according to claim 10, wherein the pipeline ~~(2)~~ comprises an inner tube ~~(31)~~, as well as a coating ~~(32)~~ provided on the outer side of the inner tube ~~(31)~~, wherein the pipeline upon sinking under water is

compressed as a result of the hydrostatic pressure on the sunk pipeline, that is, the outside diameter of the pipeline is reduced, which reduction of the outside diameter is substantially the result of compaction of the coating ~~(32)~~ as a result of said hydrostatic pressure.

12. An assembly according to claim 10 or 11, wherein at least one strap ~~(17)~~ extends along the outer sides ~~(4)~~ of the envelope elements ~~(1)~~ in circumferential direction (T) of the pipeline ~~(2)~~ for obtaining or promoting the holding of the envelope elements with respect to the pipeline ~~(2)~~.

13. An assembly according to claim 12, wherein the at least one strap ~~(17)~~, at least viewed in radial projection, extends at the location of at least one of the at least one spring portion ~~(5, 6)~~.

14. A mold, especially designed for manufacturing an envelope element ~~(1)~~ according to any one of claims 1 through 9.

15. A method for covering a pipeline ~~(2)~~ with envelope elements ~~(1)~~ according to any one of claims 1 through 9, comprising:
- above water forming a cover tube around the pipeline by bringing several similar such envelope elements linked together in the circumferential direction (T) of the pipeline in their fitted conditions; and
- sinking under water the pipeline with the cover tube formed therearound.

16. A method according to claim 15, wherein the pipeline ~~(2)~~ comprises an inner tube ~~(31)~~, as well as a coating ~~(32)~~ provided on the outer side of the inner tube ~~(31)~~, wherein the pipeline, upon sinking under water, is compressed as a result of the hydrostatic pressure on the sunk pipeline, that is, the outside diameter of the pipeline is reduced, which reduction of the outside diameter is

substantially the result of compaction of the coating ~~(32)~~ as a result of said hydrostatic pressure.