



Public Joint-Stock Company “UKRTRANSGAZ”

- **Usage of innovative repair techniques with the aim of avoidance of methane venting practices
Implementation of innovative pipeline repair methods.**

- Oleksandr Pryshchepo "Ukrtransgaz"
- Natalie Novakovskaya Main pipeline division "Cherkasytransgaz" affiliate company "Ukrtransgaz"



Figure 1: Cutting off the damaged pipeline section – still the predominant repair method in the beginning of 2000th

Figure 1 below shows the process of cutting the section with damage, which will be replaced by new pipe.





Figure 1: Cutting off the damaged pipeline section – still the predominant repair method in the beginning of 2000th

Figure 1 below shows the process of cutting the section with damage, which will be replaced by new pipe.

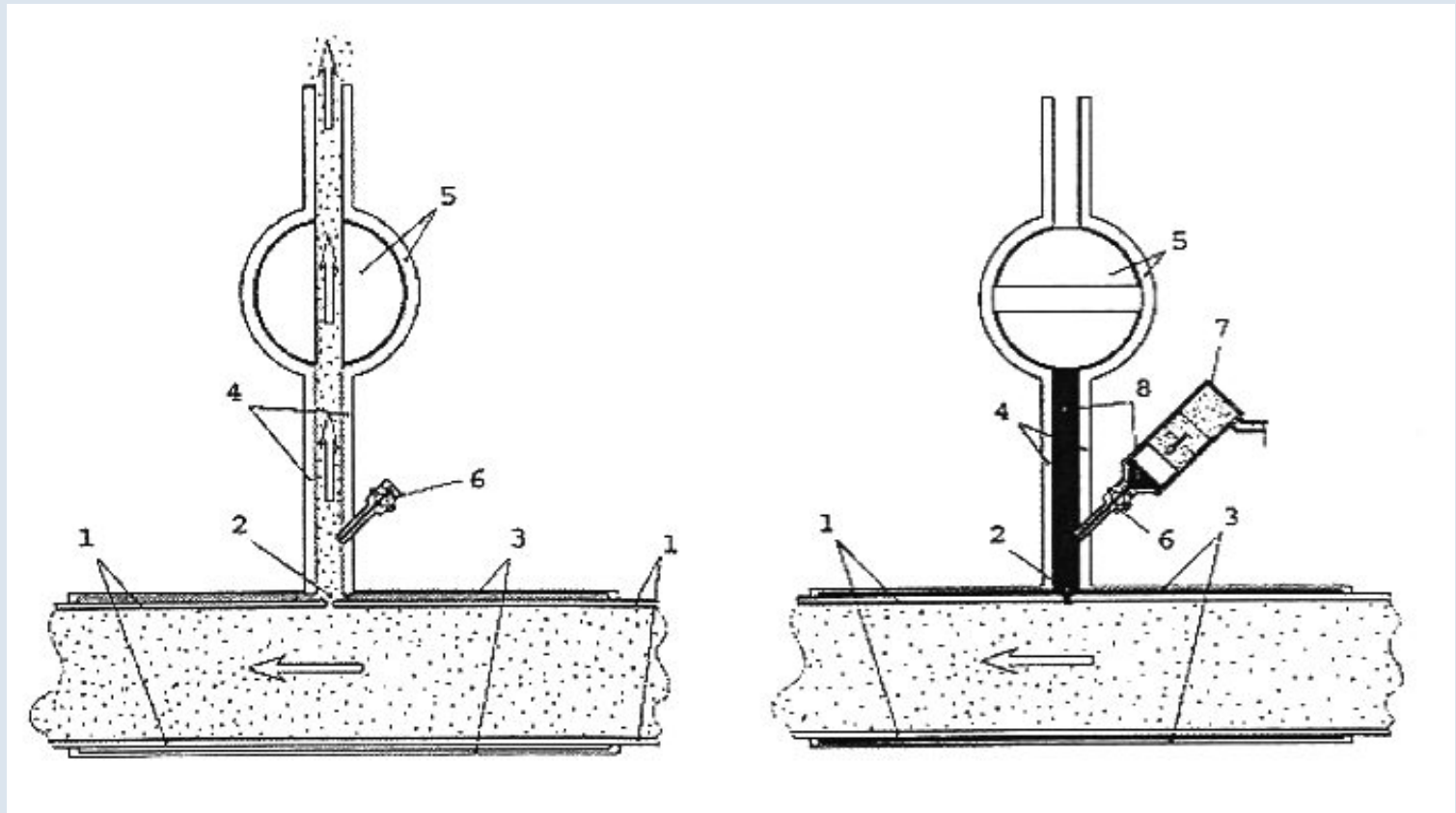




Figure 1: Cutting off the damaged pipeline section – still the predominant repair method in the beginning of 2000th

Figure 1 below shows the process of cutting the section with damage, which will be replaced by new pipe.





*Figure 2: Application of leak elimination in operating pipeline,
Pat.#59012A*

1 - the gas pipeline under pressure; 2- leak; 3- folded sleeve (made of two separate halves); 4 - supplementary pipe; 5- tap; 6- supplementary tap; 7- injector; 8- self-hardening filler.



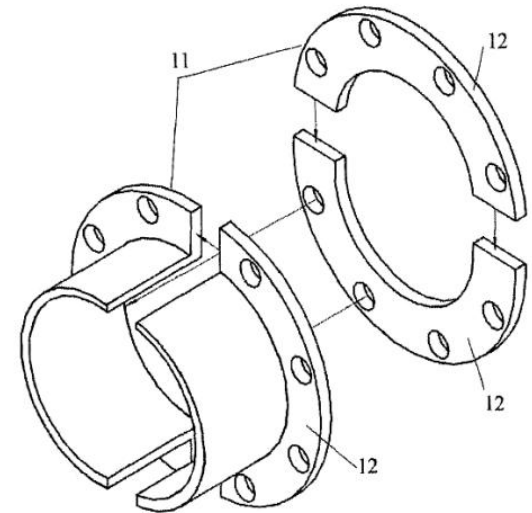
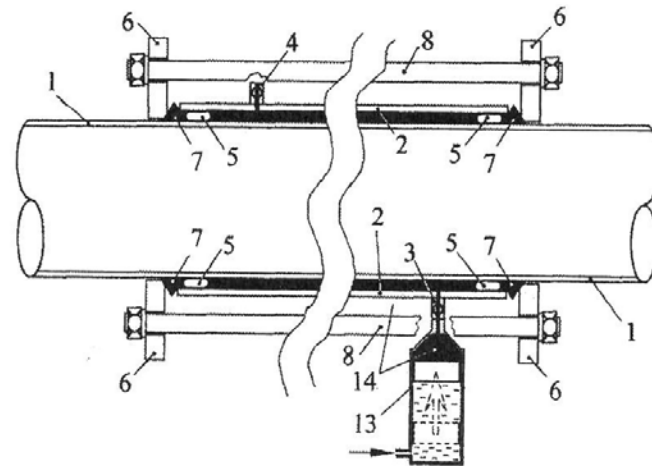
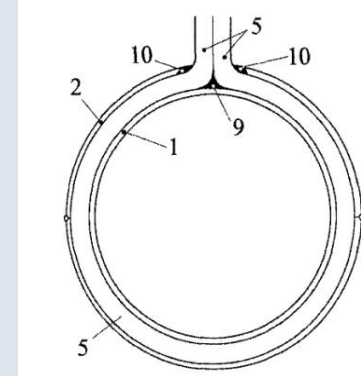
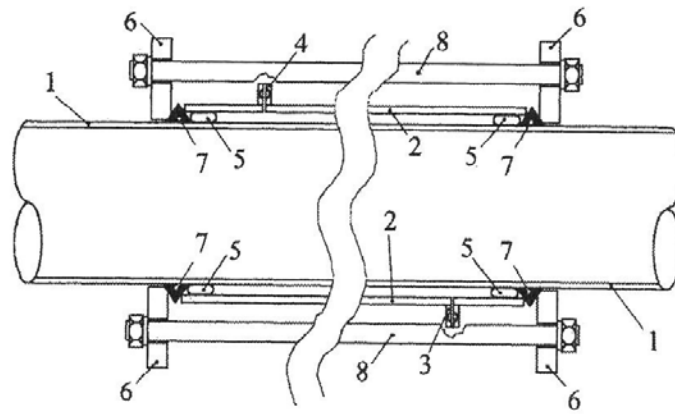


Figure 3: Method of pipeline defect repair with the use of folded sleeve and tightening flanges, pat. # 72840

1-pipeline repaired; 2- folded sleeve; 3- lower tap; 4- upper tap; 5- hose; 6- flanges; 7- additional annular wage shaped gasket; 8- locking bolts; 13- high pressure injector; 14-self-hardening compound.



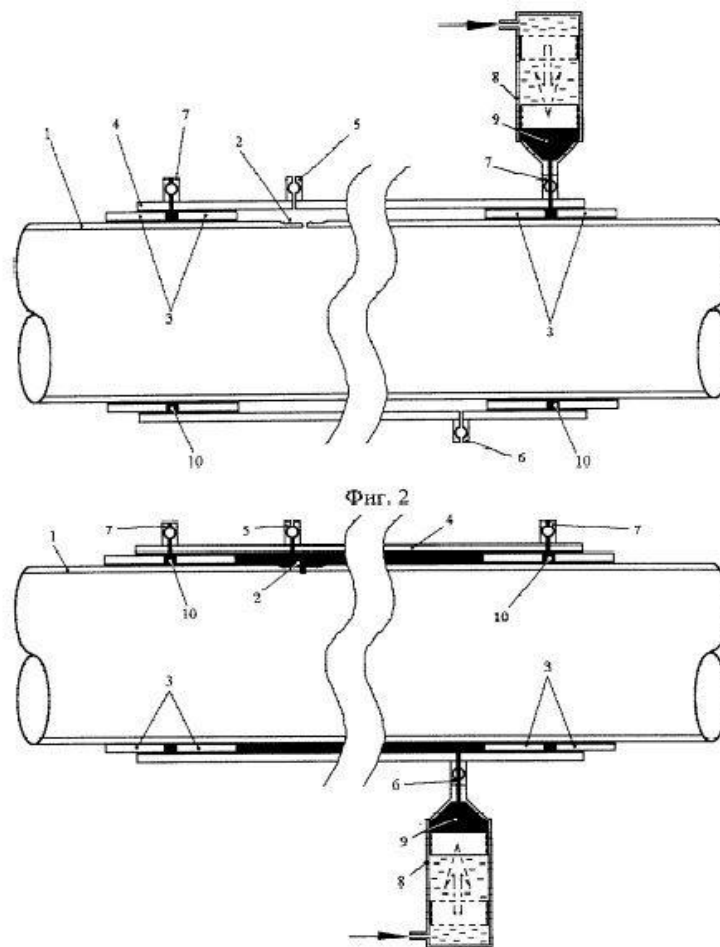


Figure 4: Method of pipeline defect repair with the use of two layer sleeve, pat. # 75859

1-pipeline, 2- damaged place, 3-rings, 4-sleeve, 5 and 6 – upper and lower taps
 7-additional taps, 8-injector, 9- self-hardening compound with filler and 10
 annular gaskets.





Figure 5: Application of two-layer sleeve

adjustment of the rings and sleeve





Figure 5: Application of two-layer sleeve

assembling of the sleeve (rings on place)





Figure 5: Application of two-layer sleeve

welding (a chain of several sleeves is shown which is covering multiple defects)



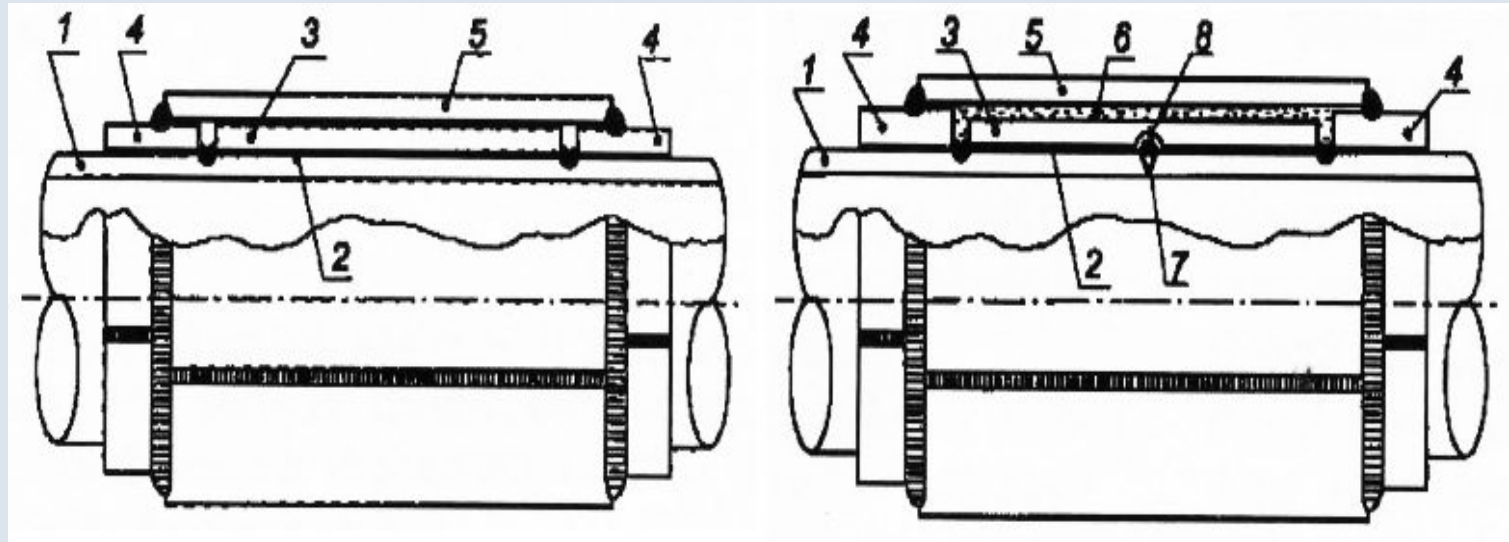


Figure 6: Double sleeve repair method, pat. #76390

1 - Pipe repaired, 2- section with defect, 3 – inner sleeve, 4- rings, 5- reinforcing sleeve, 6- gastight self-hardening compound, 7- existing welding seam on repaired pipe, 8 – groove made on inner sleeve to accommodate the overhanging welding seam on the pipe surface.



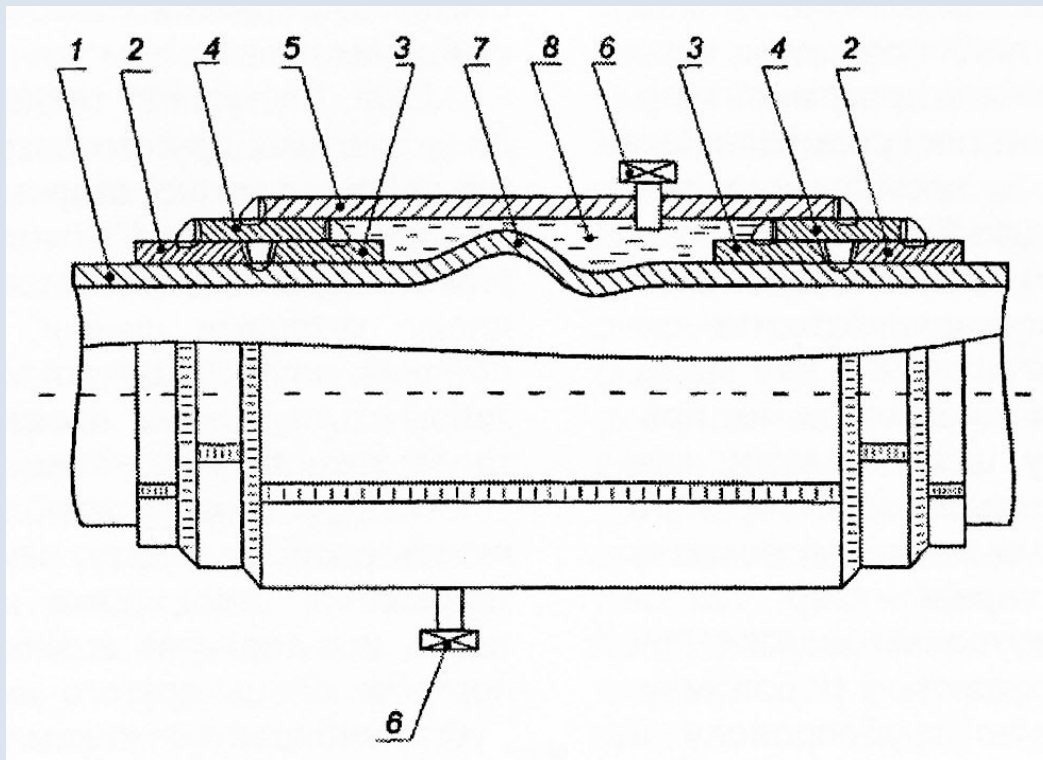


Figure 7: Three layer sleeve repair method, pat #76391

1 - pipe repaired, 2 and 3 – first layer of service rings, 4-second layer of rings, 5 – reinforcing folded sleeve, 6- tapping, 7 – corrugation, 8 – compound.



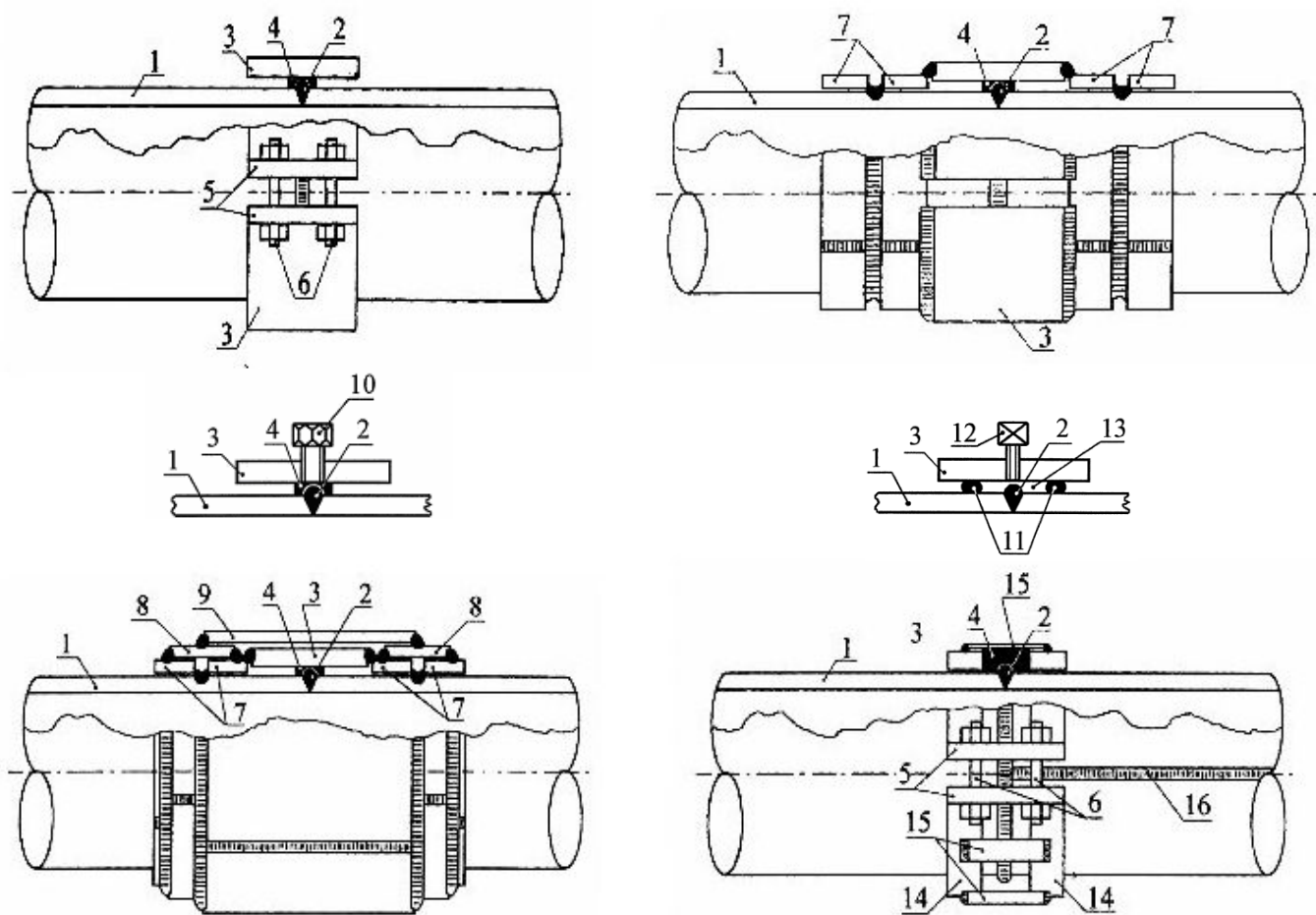


Figure 8: Method of leaking section repair (pat.# 77930)

1-repaired pipe, 2- welding seam having leak, 3- clamp, 4- gasket, 5 and 6 flange and bolts, 7- supplementary rings, 8- secondary rings, 9- main sleeve, 10 – bolt, 11- annular gasket, 12- supplementary tap, 13 – self-hardening compound, 14 – circular clamps, 15- connectors, 16- axial weld.



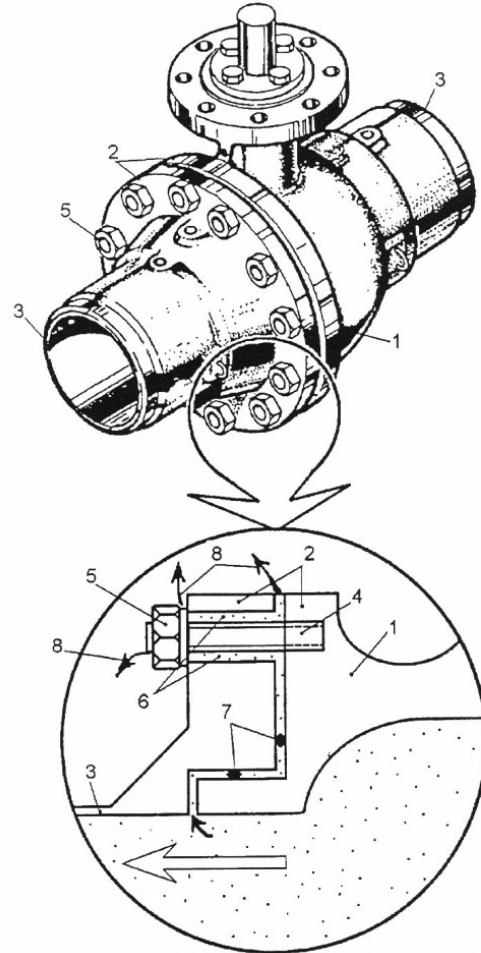


Figure 9: Tap design and leakage occurrence.

1 - Body of the tap, 2- flange joint, 3 – pipeline, 4 – double-end-bolt, 5 – nut, 6 - inner space of stud joint, 7 – gaskets, 8- leaking gas.



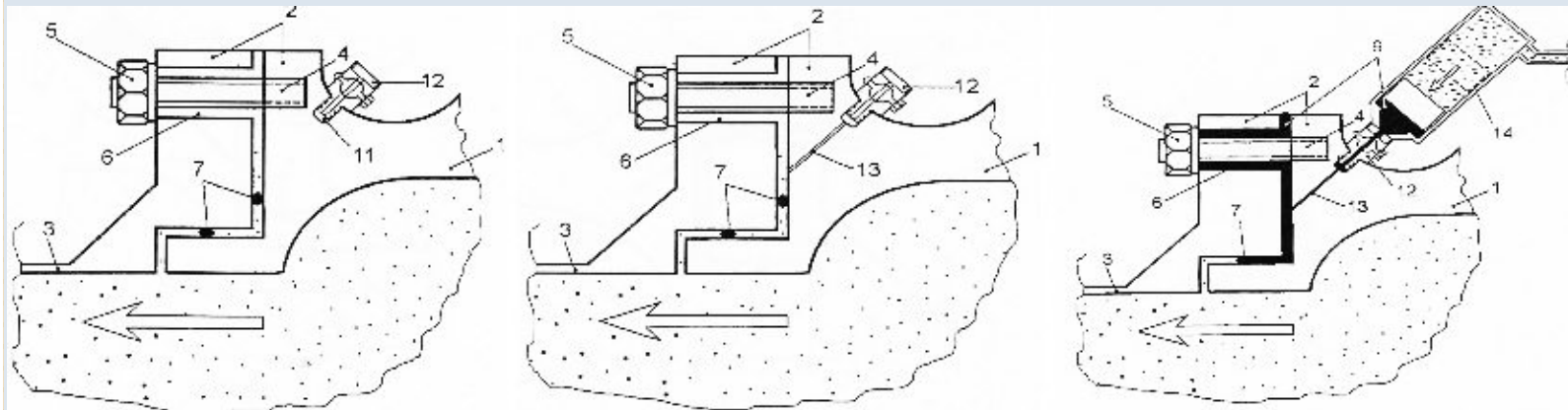


Figure 10: Method of elimination of leakages through flanged joints of taps without stopping the operation of the pipeline, pat. # 42619.

1 -Body of the tap, 2- flange, 3- pipe, 6- annular space around the bolt, 7 - gaskets, 9- self-hardening compound, 11 – blind bore where thread is made for service tap, 12 – service tap, 13 – injection bore, 14 – injector.



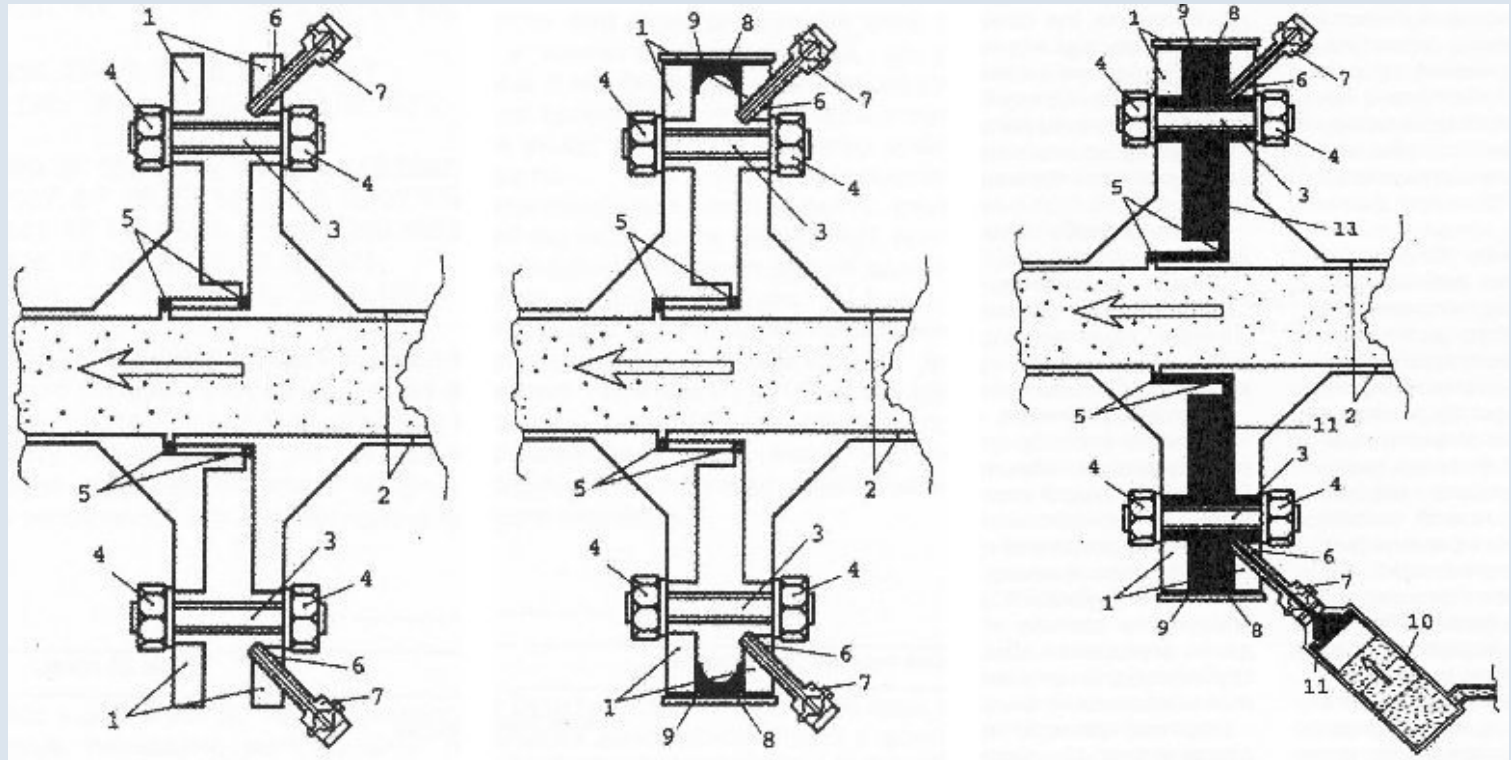


Figure 11: Repair of flange joint with the use of clamps, pat.# 59013

The improvement consists of installing gasket 9 and shroud ring 8 before the injection which helps preventing the spill-out of compound injected. The other details are similar to the previous method



Year	2005	2006	2007	2008	2009	2010	2011	2012
Number of repairs	<70	93	94	117	99	>116	160	160
Amount of gas saved, mln. m ³	71	98	100	106	105	122	>170	>170

Year	2005	2006	2007	2008	2009	2010	2011	2012
Number of repairs	<70	93	94	117	99	>116	102	160
Amount of gas saved, mln. m ³	71	98	100	106	105	122	>170	>170

Table 1. Number of repairs made using innovative methods over years, 2011 and on -forecasted

The number of repairs made using innovative methods has been growing over the years as shown in a table above



Implementation of innovative joints repairs methods.



Thank you for your attention.