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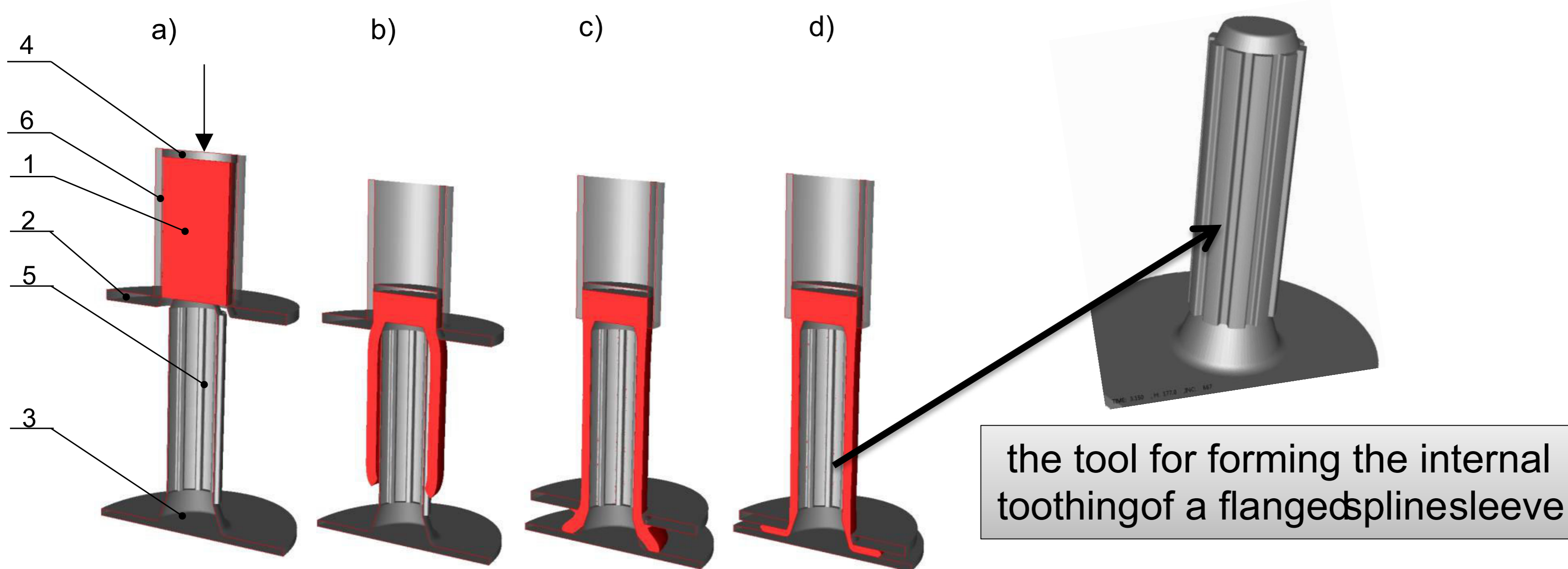


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## New unconventional process and tool of plastic forming of the internal tothing of coupling spline sleeves

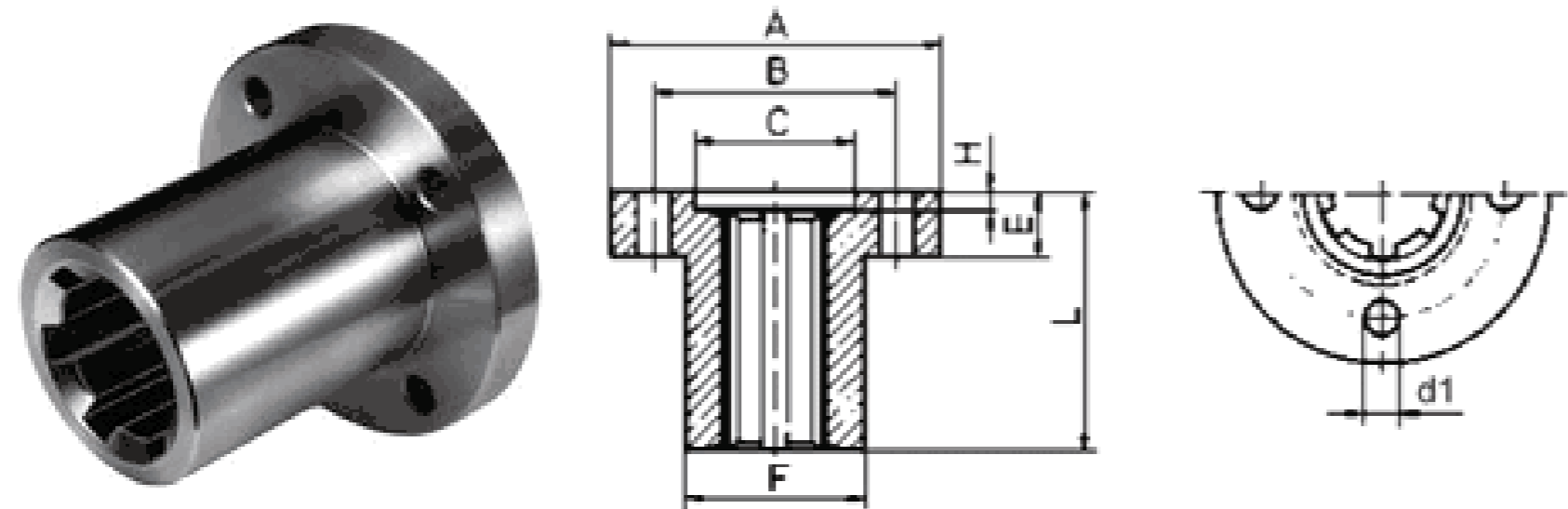
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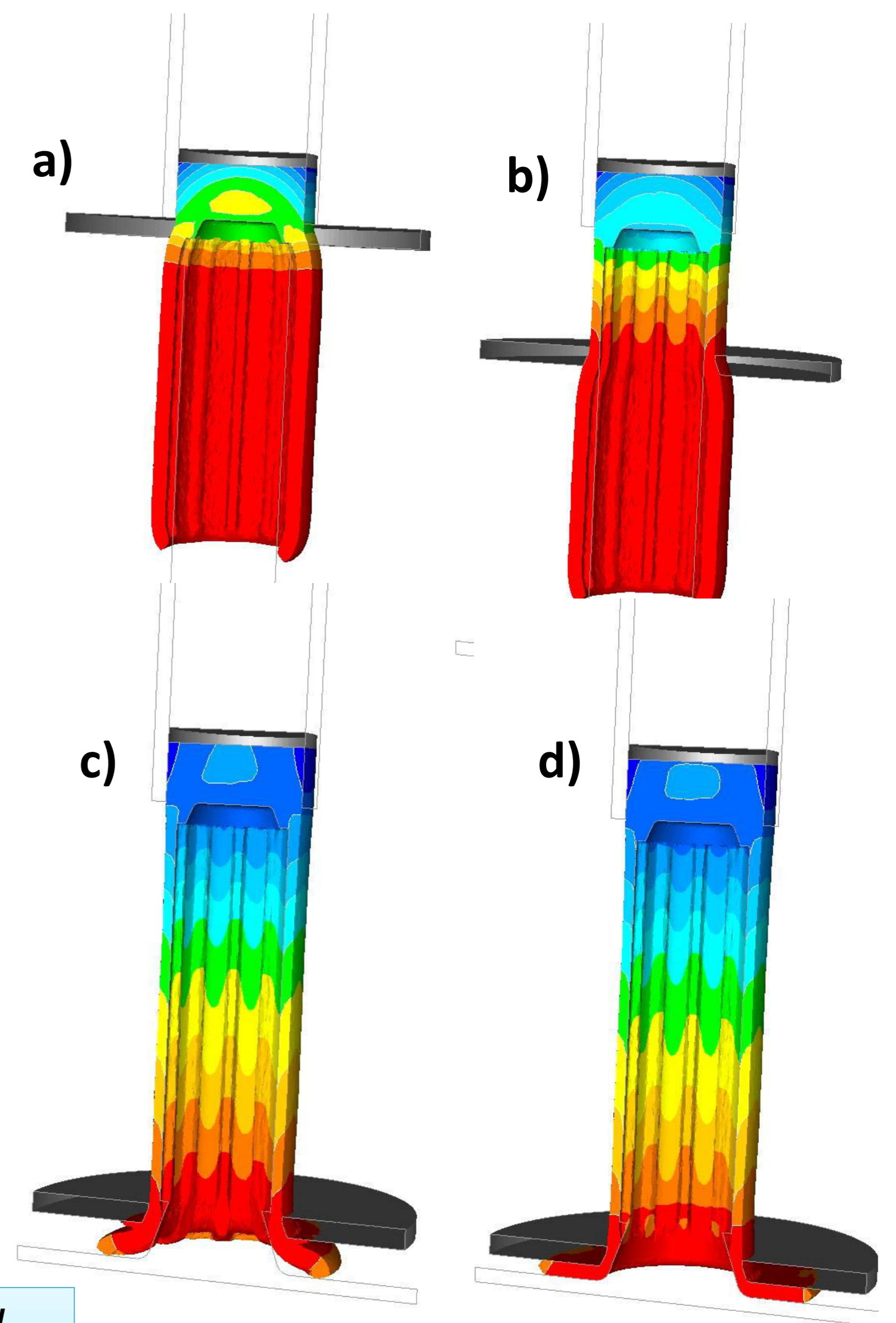
(Fig. 1) 1. perform 2. die, 3. mandrel base, 4. punch, 5. mandrel, 6. container

### Products manufactured according to the patent method - flanged spline sleeve

(Fig. 3)



At the first stage (Fig1b), the process involves the direct extrusion of a conical thick-walled hollow. The second stage includes the die press forming of the sleeve wall on a mandrel with impressions, as a result of which the wall thickness is reduced. At the final third stage, the die presses the flange formed at the second stage on the mandrel base



(Fig. 2)

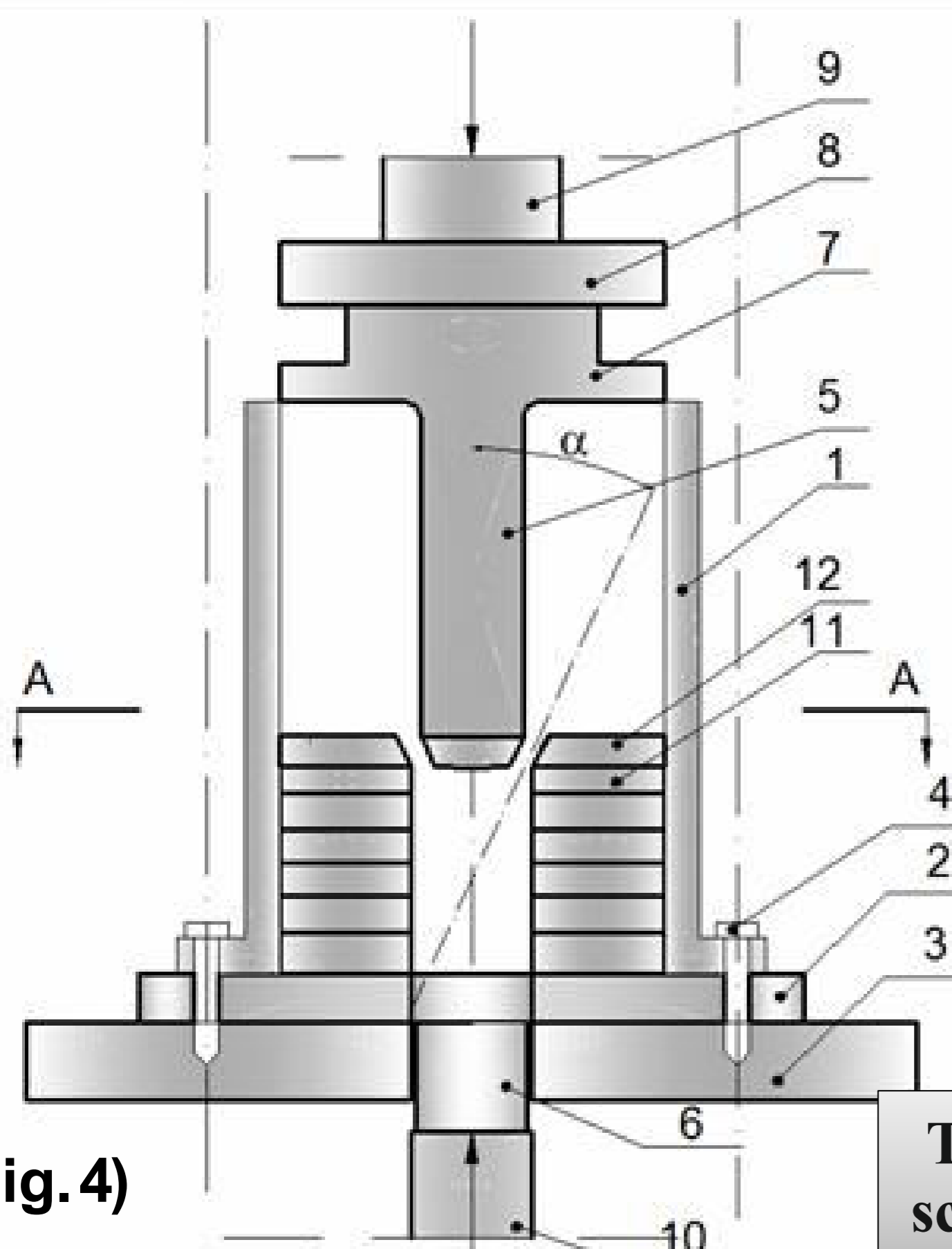
NUMERICAL MODELING PROCESS (FEM)

2

## The new thool of plastic forming of internal tothing in flange spline sleeves Polish patent PL 235009

The tool operates with a double-sided press, where the stock positioned in sleeve 11 is co-extruded with ejector 10 and pusher 6 through the clearance between die 12 and punch 5. A conical sleeve forms with a preliminarily profiled internal tothing. Next, after pusher 6 and ejector 10 retract, the conical sleeve is drawn through die 12. Then, the sleeve is gradually stretched, the internal tothing is finish formed, and the sleeve flange is preliminarily formed by turning up on plate 7. After punch 5 has gone into sleeve 11, plate 7 will press the spline sleeve flange on the surface of die 12. The simultaneous return motion of pusher 6 and punch 5 will remove the finished product from the tool.

(Fig. 4)



The concept of a numerical computation verification tool. 1. body, 2. base, 3. press table, 4. clamping screws, 5. punch, 6. pusher, 7. plate, 8. cross-beam, 9. drive, 10. ejector, 11. sleeve, 12. die.