

Positioning Accessories for Conventional Radiography in Pediatrics

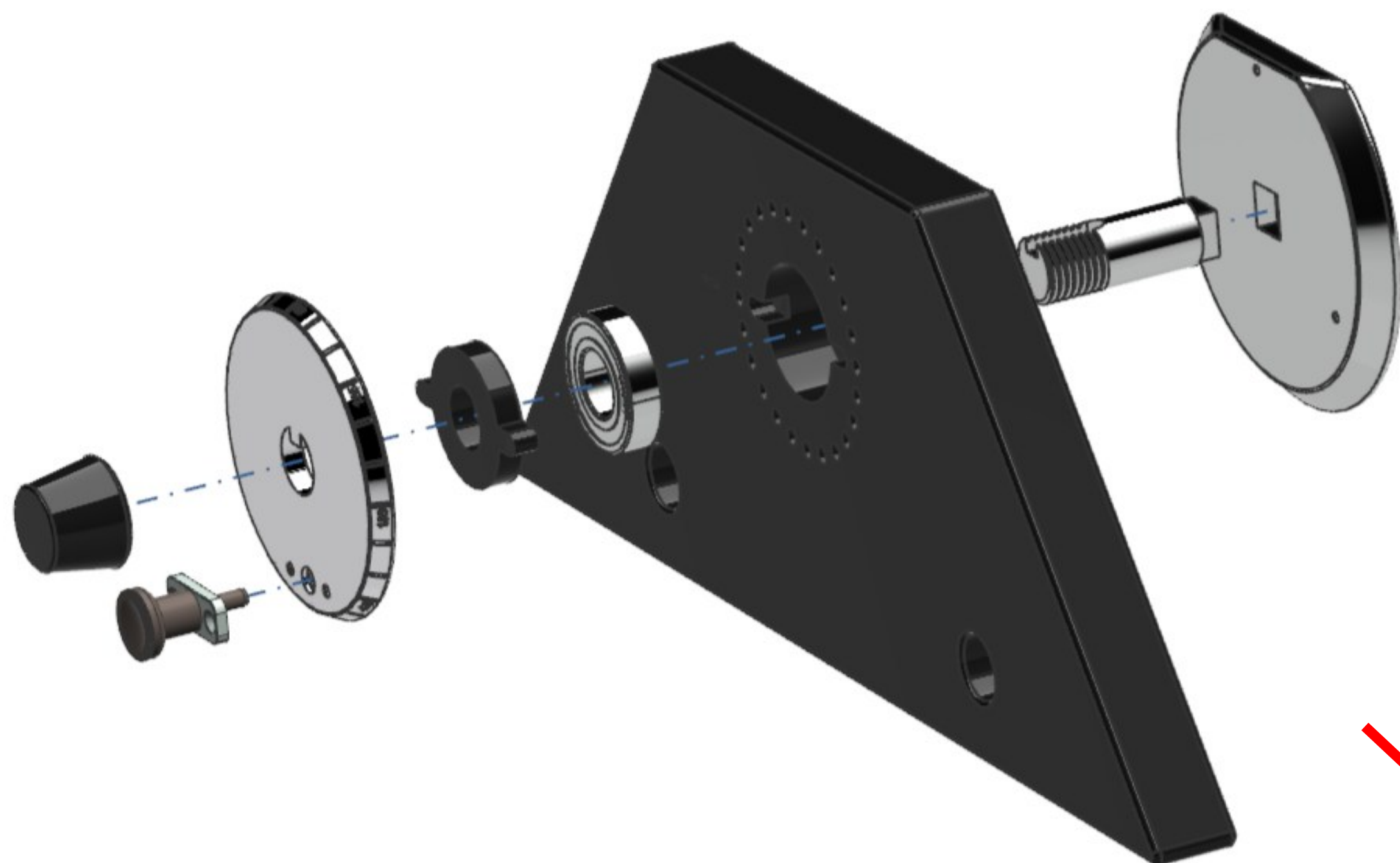


Fig. 1

Structure of the finishing mechanism with the individual components: Cap for fastening, locking bolt, washer for angle display, ball bearing with fastening cover, holder with holes and rod with fastening washer.

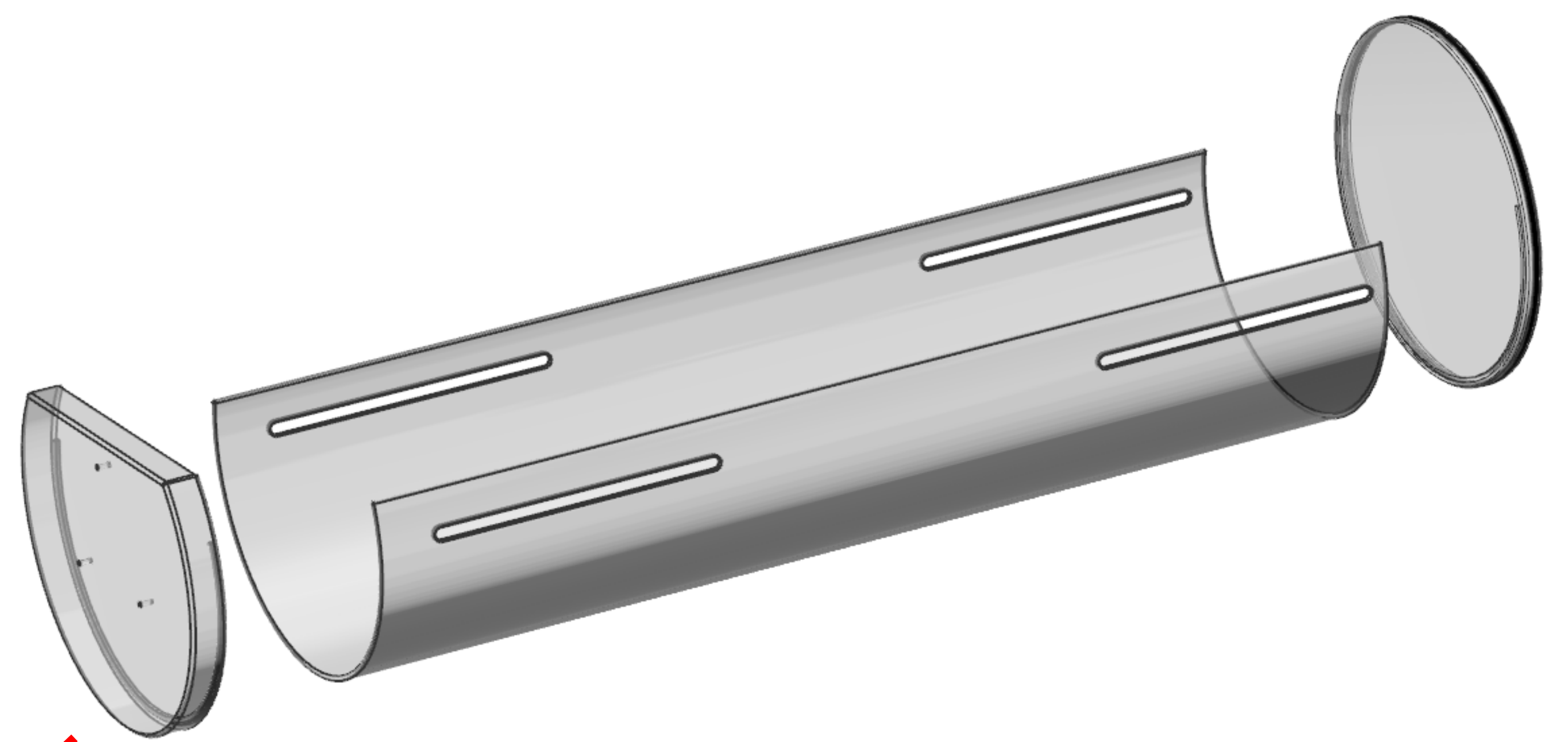


Fig. 2

Cradle with the four components: An adjusted Plexiglas tube in the middle, a cover on the right and left and an O-ring for placing on the table.

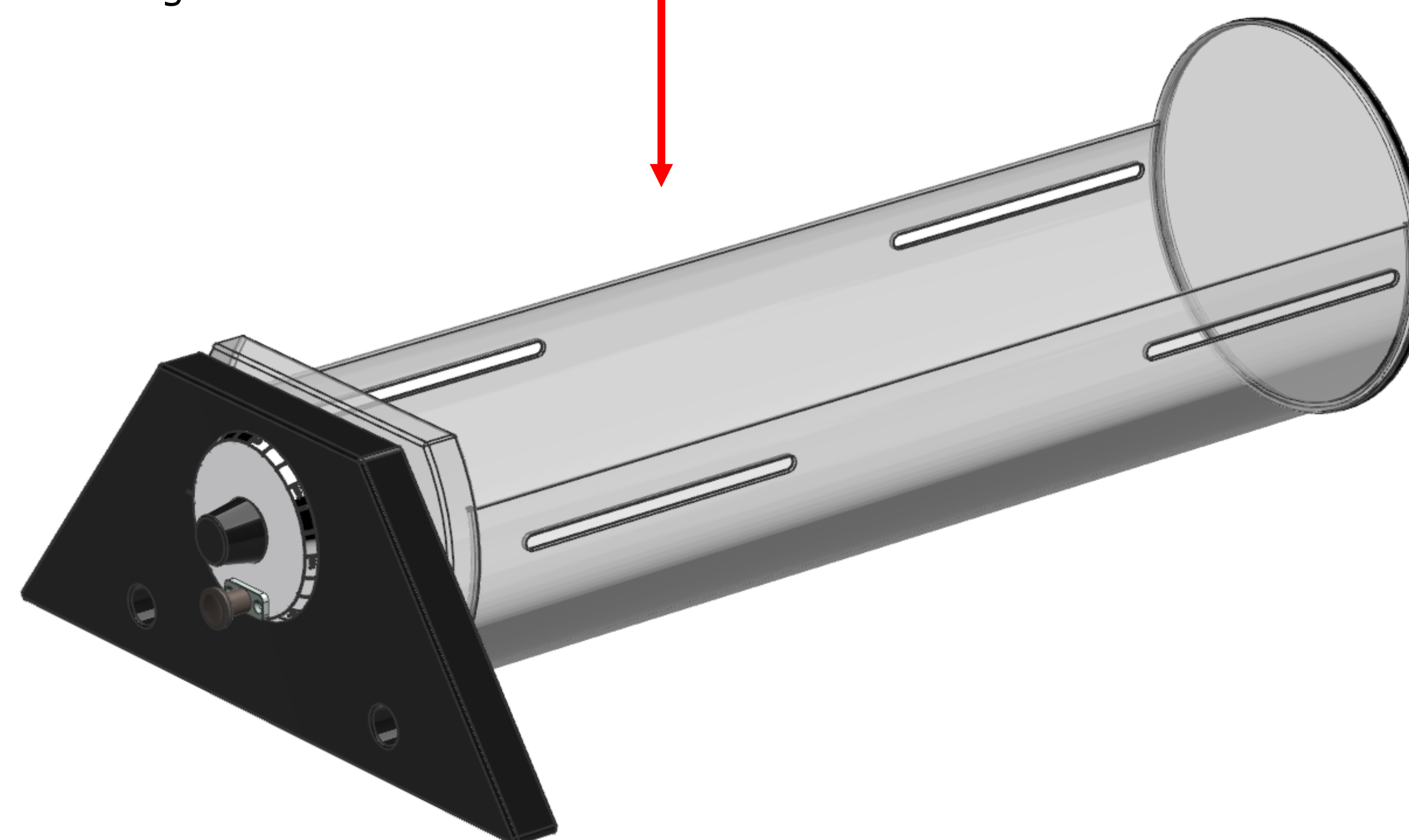


Fig. 3

Prototype Pediatric Positioning Device X-Ray

Task

In X-ray examinations of newborns and infants, the limited ability to cooperate often leads to movement during the image acquisition. This results in movement artifacts and image distortions, which can limit the diagnostic value.

Correct positioning is crucial for high image quality and the safety of children. However, there are currently only a few suitable positioning aids available on the market. In addition, these are usually impractical and inadequate for clinical use.

For this reason, this master's thesis deals with the development of an improved positioning aid. The aim is to develop a fair solution that meets the clinical requirements for X-rays and at the same time offers an improvement on existing products.

Method

The development was practice-oriented, user-centered and based on relevant medical standards. Following clinical visits and a subsequent market analysis, a structured catalog of requirements was drawn up. Based on this, various concepts were designed, iteratively developed and coordinated with clinical partners. Following this, the prototype was designed using NX Siemens.

Results

Following several visits to clinics and a comprehensive market analysis, the market potential for a new positioning aid was confirmed. Based on this, a specific catalogue of requirements was drawn up, considering the clinical requirements and regulatory specifications. Concept ideas were sketched, modelled in CAD and prepared for implementation. The prototype is currently in production. A design consisting of a holder with a locking mechanism (Figure 1) and a Plexiglas cradle (Figure 2) is planned.

The bracket is rotatably mounted via a ball bearing and allows different positions to be fixed using a PA raster bolt. The other components are made of aluminium and POM. The indentations in the cradle are used to attach medical accessories (Figure 3). When selecting the materials, special attention was paid to biocompatibility to enable later clinical use.

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