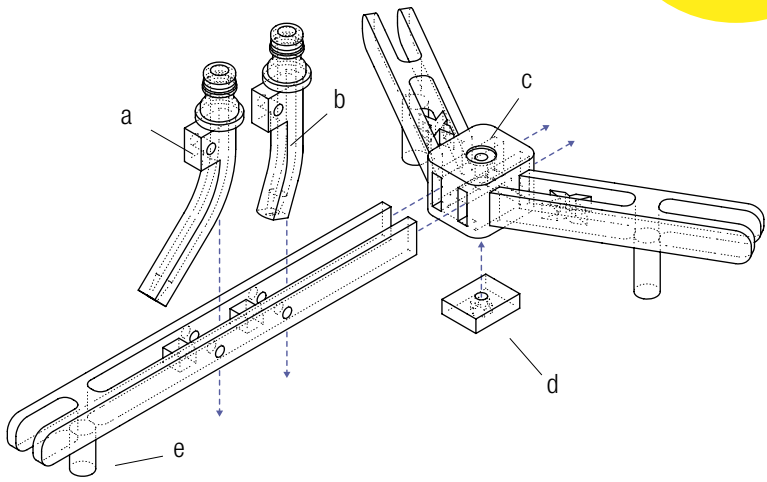


Urinator

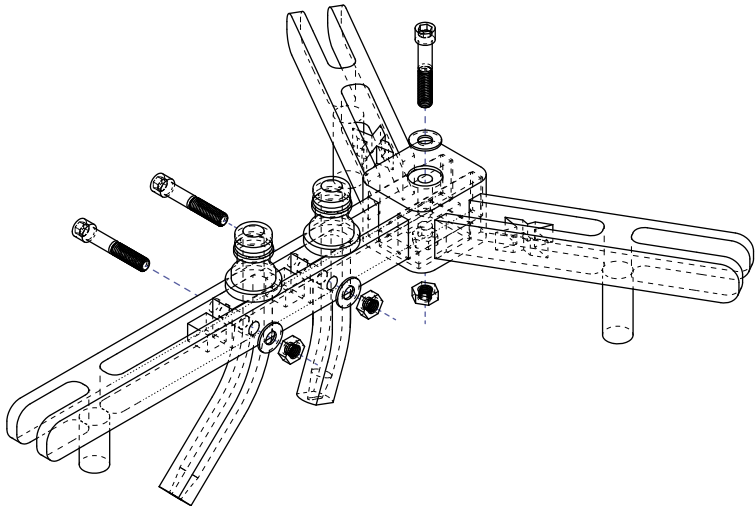
by: E00S

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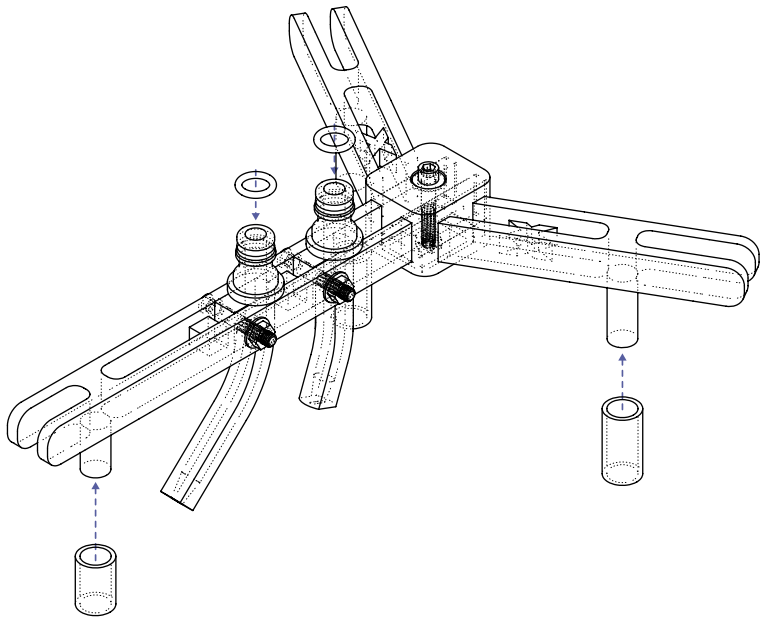
1

- a male urethra
- b female urethra
- c Urinator back
- d clamping unit
- e Urinator front



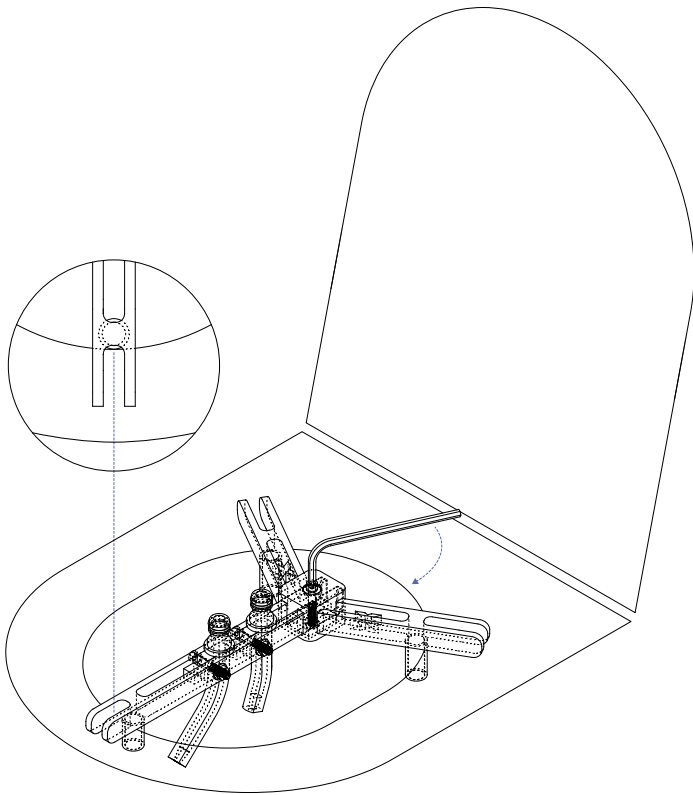
2

- 1 x M6 40 mm bolt (DIN 912 A2)
- 2 x M6 30 mm bolt (DIN 912 A2)
- 3 x M6 nut
- 3 x M6 flat washer



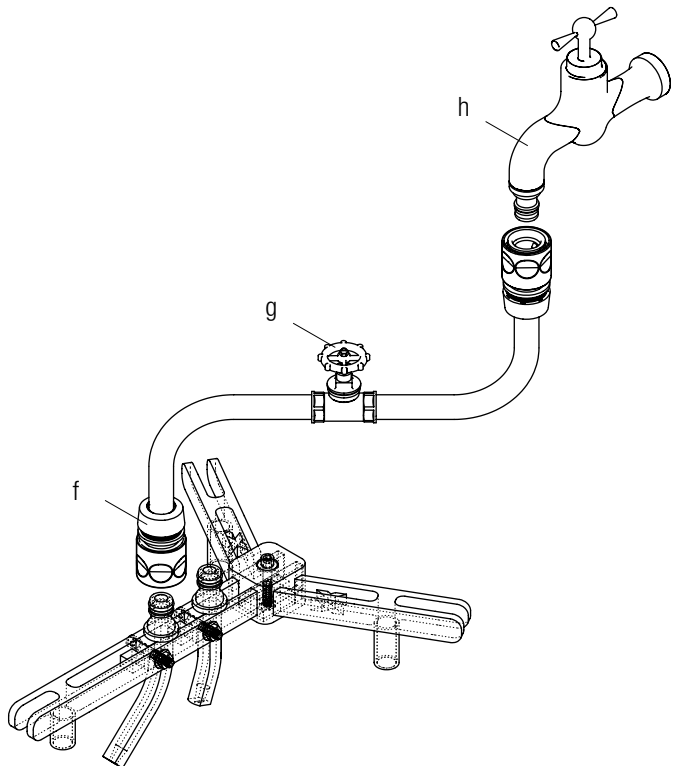
3

- 2 x O-ring 9 mm (e.g. Gardena)
- 3 x hose (inner diameter = 13 mm, material thickness = 2 mm)



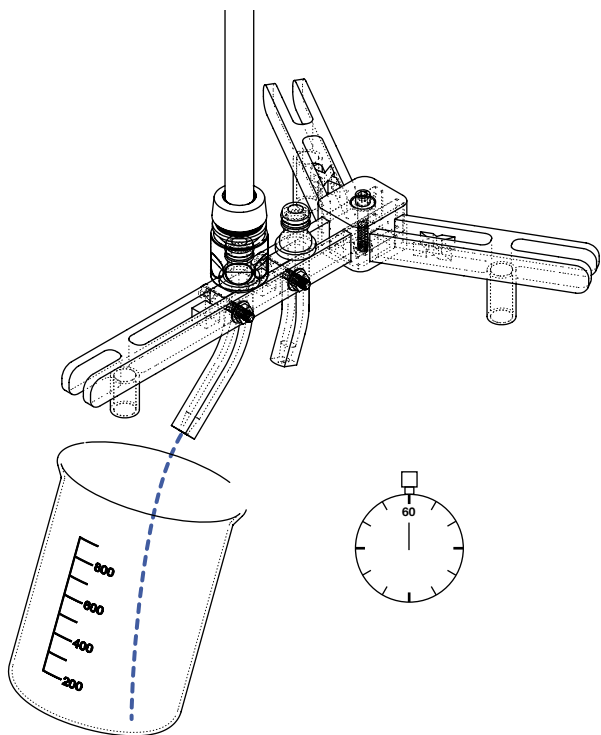
4

Position the Urinator centered on the toilet seat. Tighten the clamping screw.



5

- f garden hose system (e.g. Gardena);
- g regulation valve
- h water tap



6

Simply measure the urin flow (ml/sec) with a measuring cup and a stopwatch.

The Urinator is a tool for the development of urine separation toilets. The current version of the Urinator is designed to test, compare, and ultimately improve sitting separation toilets by simulating male and female urine streams.

Urinator Design Research

As there was a lack of data in scientific publications about the urine streams of seated people, EOOS began generating data with various methods. The departure point for the research was a toilet seat on top of an experimental setup that ensured free urination below. The urine was collected at the ground level, which facilitated a measurement of the amount of urine. The trajectory of the urine stream was recorded with an infrared camera (fig. 1). The different urine streams of seated people were digitalized and abstracted so that a general spectrum of urine streams could be defined for men and women respectively.

The male urine stream contacts the inside of the toilet at the front, making the separation of urine and feces unproblematic. Men can target their stream and easily hit a certain area of the inner form of the toilet. Women can also change the general direction of the stream by tilting the pelvis but not so precisely as men. From the tests EOOS conducted we can ascertain that the urine stream of women often coincides with the fall line of feces and thus complicates separation. In rare cases a female urine stream was recorded which was behind the fall line of the feces.

The objective of this abstraction of the numerous observations was not a scientific evaluation rather to arrive at a practical model for a simple device which designers and builders can use to test and improve urine separation toilets. To this end, the Urinator has become an indispensable design development tool at EOOS for acquiring quick feedback about the functionality of separation provisions and avoiding time-consuming user tests in early development stages.

The Urinator Urine Stream

In order to imitate the turbulences of a natural urine stream the two urine nozzles (m/w) on the Urinator have a flat outlet. During urination the urine has different flow speeds. The diagram (fig. 2) illustrates the changes in the urine speed along the timeline. As various flow speeds can also have an effect on both the separation behavior and the user's experience (turbulences, splashing, overflow), EOOS recommends testing separation toilets at various speeds. In order to attain reliable measurements the Urinator should be adjusted toward the front inner edge of the toilet seat. Realistic tests can also be made by turning or tilting it during use.

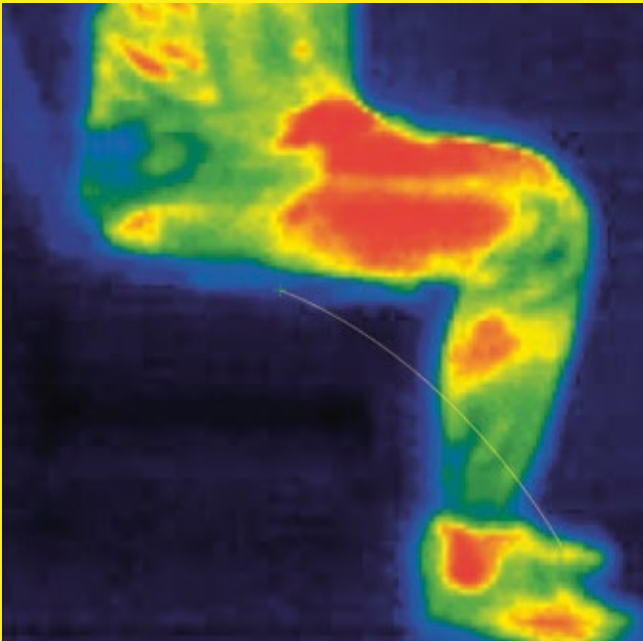


Fig. 1 male urethra

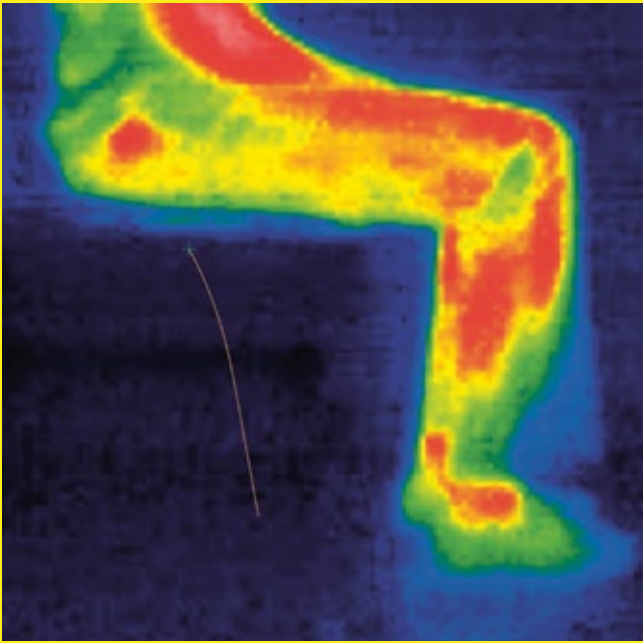


Fig. 2 female urethra



Urine flow measurement

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