

## How to make a mouth opener (gag) for elephants

This device was developed by Christopher Dremme in Indonesia for tube feeding elephants with tetanus. It has been used since then for bronchoscopy and bronch-alveolar lavage (BAL) (Imke Lüders, Willem Schaftenaar, Jan Bos).

The models shown here (figure 2,3,8 and 9) are made of (stainless) steel and are based on two 400 mm long threaded steel rods (20 mm diameter), preferably with a thread like in tie rods used in scaffolding (figure 4). Normal thread can also be used, but will require more rotations (=time) to open the mouth.



Figure 1. Elephant mouth opener developed and used by Christoffer Stremme

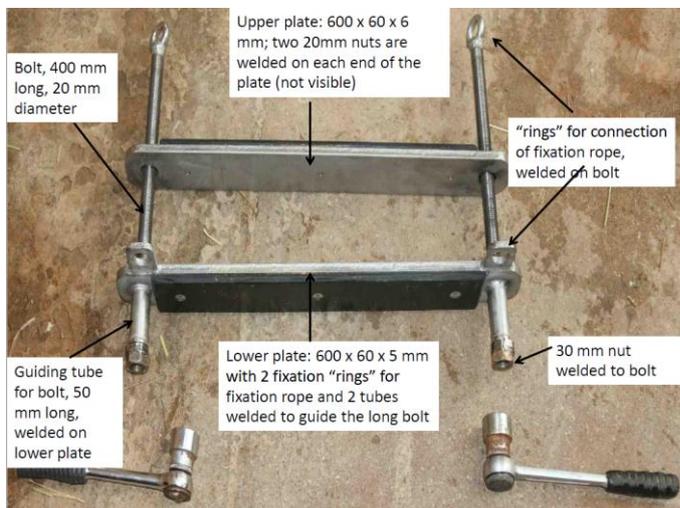


Figure 2. Type 1 *elephant mouth opener* (gag), pushing the upper mouth piece up, including 2 detachable handles (ratchet spanners). Note: the 2 rings on the upper mouth plate are still missing.



Figure 3. Type 2 *elephant mouth opener* (gag), pushing the lower mouth piece down, including 2 fixed handles.



Figure 4. Steel tie rod (used for scaffoldings)



Figure 5. Anchor nut

Each rod is independently but simultaneously turned by an assistant so the upper mouth plate is moved up parallel to the lower (type 1) or the lower plate is moved down (type 2).

There are 2 options for the connection of a turning handle:

1. In the device shown in figure 1 an anchor nut is welded to the end of each rod. Two ratchet spanners are used for turning the rod. Once in position, the spanners are taken off. This option is easier to make than option 2.
2. In the device shown in figure 2, the anchor nuts are welded to the lower mouth piece each rod has one handle welded to the rod. The advantage is the ease to turn the rods. The disadvantage is the place these handles occupy during manipulations. They can also be made as detachable handles.

The dimensions of the mouth pieces are 600x50x7 mm. A 50 mm wide plastic strip with rounded edges can be glued or screwed on the outside of each plate to protect the mucosa of the mouth. These plates should not be too thick: the thicker the total diameter of the piece is, the more difficult it is to place the device between the jaws.

Four rings should be welded to the mouth plates as shown in figure 3. The straps to attach the device to the elephant are fixed to these rings. For type 1 an anchor nut is welded on each edge of the upper side of the upper mouth plate (figure 6). A normal steel nut (35 mm) is welded to the lower and upper end of each steel rod. A steel ring (30 mm diameter, 3 mm thick) is welded on the threaded rod as indicated in figure 7. For reasons of stability, a steel tube (30-50 mm) can be welded on each side of the the lower mouth piece (figure 7).

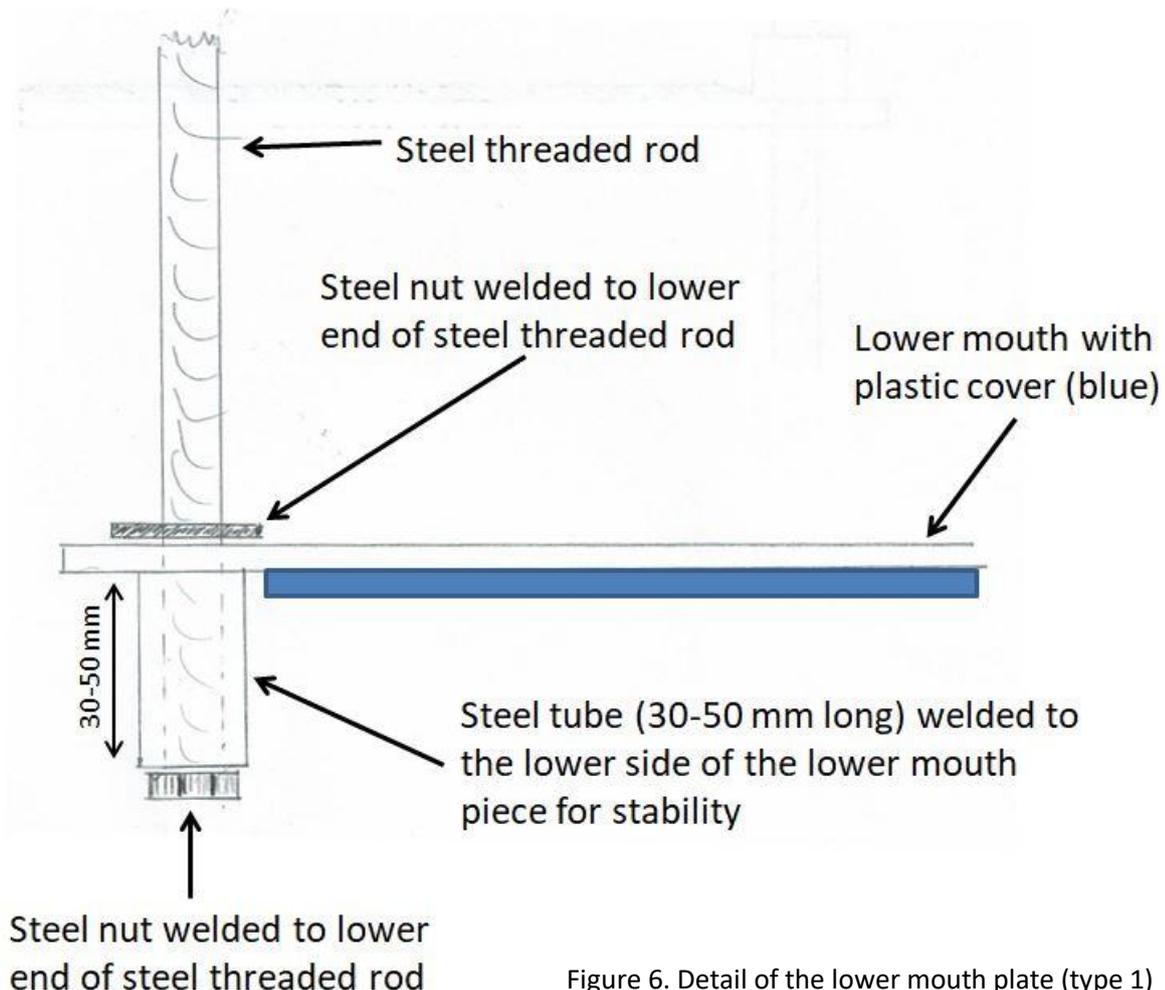
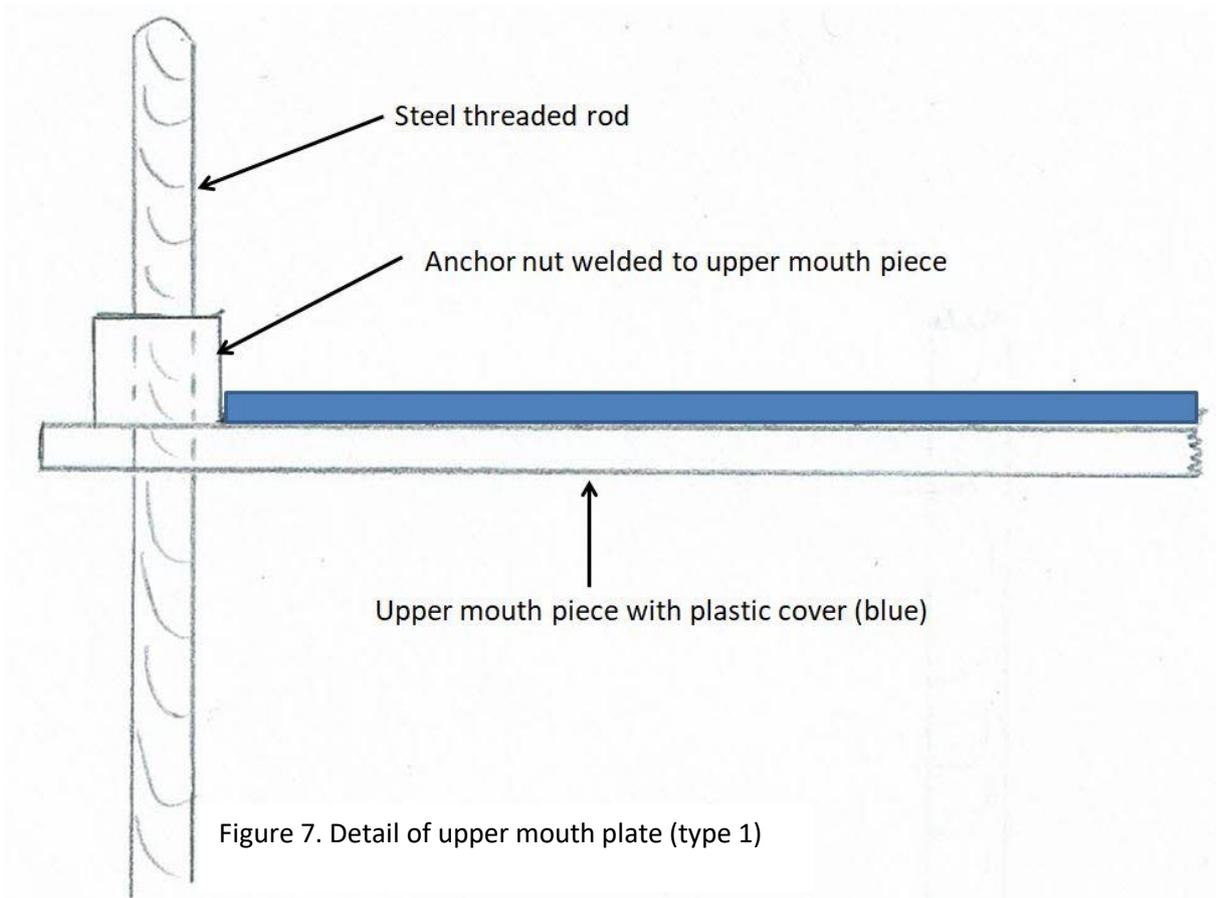


Figure 6. Detail of the lower mouth plate (type 1)



The device shown in figure 2 was developed to use in an adult African elephant bull. The long ends of the steel rods pointed downwards, which leaves more space for the tusks. The 2 nuts welded on each end in type 1 allow using the device in both ways.



Figure 8. Type 1 mouth opener used in an adult Asian elephant for molar inspection.



Figure 9. Type 2 mouth opener used in adult African bull for BAL

Reference:

Lueders I, Stremme C. 2021. Construction of a full mouth speculum facilitating oral examinations, bronchoscopy and gastric tubing in elephants. Construction of a full mouth speculum facilitating oral examinations, bronchoscopy and gastric tubing in elephants. Tierart. Praxis 2021.