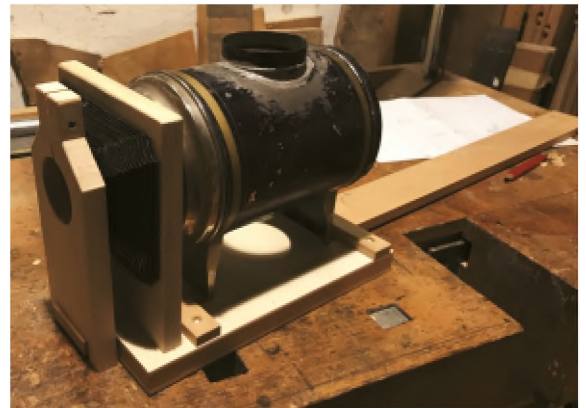


THE ONE CANDLE THEATRE AND THE SELF-FOCUSSING LANTERN

Felix Cikanek

The One Candle Theatre (formerly LAO) is really small – all the equipment can be placed on a table and back projection is standard (look us up on Facebook: *One Candle Theater – Laterna magica Theater by Elli & Felix*). It's perhaps not surprising that we thought phantasmagoria would be a nice new feature for our programme. Therefore a moveable lantern, projecting images from small to tall – and vice versa – was the next piece of equipment we needed. But there was nothing like this on eBay ... and as has been the case many times before, I had to look for a solution in my workshop using something I already had. A wrecked toy lantern soon emerged and, along with a bellows extracted from a camera and a lens from an old slide projector, the main components for the object of desire were assembled – in my imagination. It looked easy!

The toy lantern was mounted on a wooden base. A long moveable strip of wood (the 'focussing stick') bearing a front support with the lens can be adjusted



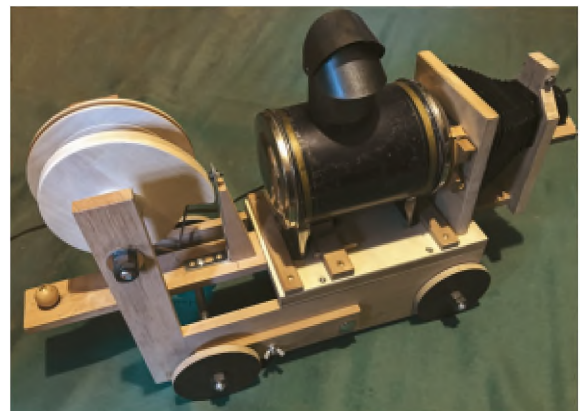
1. *The original idea – with base and focussing stick*



2. *Work in progress – building up the gear for the rotating cam axle*

over the full length of the base for focussing. A second support in front of the condenser was connected to the lens support by the moveable bellows (like a camera). A quickly installed electric controller to reduce the light when the image is tiny and the device should be fine. After a couple of days in the workshop everything was assembled and ready for takeoff. And it worked!

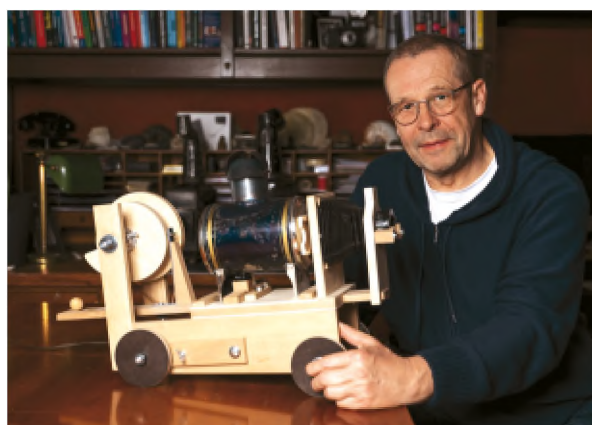
But ... moving the lantern by simply sliding it on the table, handling the controller and focussing properly would need the amazing hands of a great magician. Practising the tricky movements I experienced what I knew already from macro photography. The nearer the lens is placed to the screen (for very small image projection) the more you have to extend the bellows for focussing; far away from the screen the bellows extension movement is minimal. To cut a long story short, it would never work by focussing with two hands.



3. *The complete mechanism seen from the side with the cam*

At this stage of the story I can hear a murmur citing the celebrities of the lantern: "Molteni", "Fantascope", etc. Known examples of the fantascope (and I know we would all like one) are almost the size of my whole theatre! Thanks to Jeremy Brooker I was introduced to Joel Schlemowitz who built a fantascope on wheels. He had a great deal of useful advice for me. But Joel's lantern doesn't have an autofocus – he focuses by hand, as most of the historic examples do. I suppose the bigger the theatre, the smaller the focussing problems – and so the great size of the problem when working in the 'One Candle' space. Maybe for this reason the rather unreliable mechanism that drives the lens focussing from the movement of the carrying wheels (see Thomas Weynants, 'The Phantasmagoria', *Servants of Light*, MLS, 1977) was not so widespread.

I studied all the images shown in the publications of the MLS concerning lanterns on wheels and lanterns on wheels with autofocus. It all looked interesting, but there was no information on the details of the construction of the focussing mechanism. And these bulky although ingenious machines could not be reduced to a size fitting the One Candle Theatre.



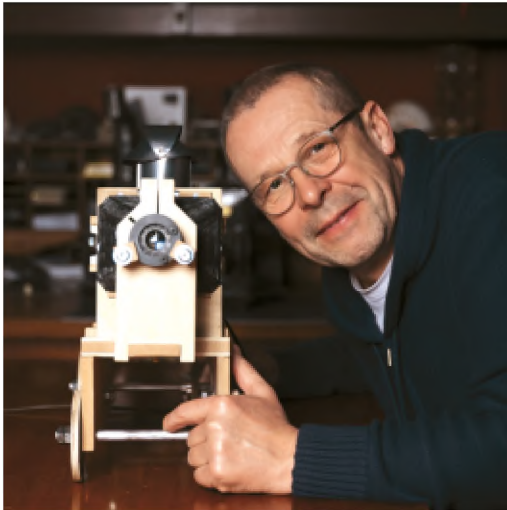
5. *Cam in middle position*

Back to the workshop (and the drawing board) and first I put the lantern on wheels, which was fairly easy. Next I experimented with the bellows – the extension and lantern distance from the screen. That means I measured

every millimetre of the lens extension in relation to the movement of the whole lantern as it moved through one metre (the One Candle projecting distance). The results of the measurement were entered in a table and later translated into a diagram of a circle. This diagram was the basis for the shape of a cam, the heart of the focussing mechanism.



4. *The cam in the position with maximum bellows extension*



6. *The diaphragm for light regulation*

Then, what a surprise – the shape of the cam looked just like its ancestors in the fantoscope. It works like this: if my lantern is moved one metre back or forward, the cam rotates one complete revolution. For that reason, I had to construct a gear driven by the axle of the rear wheels. A crossed leather strap makes the cam rotate the right way. A kind of lever attached to the 'focussing stick' that I mentioned earlier can now follow the shape of the cam. Where the projection distance is short, the shape of the cam is steep; where the distance is long, the shape of the cam is nearly a circle.

Finally I added a few features to the lantern. The front axle can be adjusted using different holes. This is because the lantern, when standing or moving on the table, is not at a right angle to the middle of the screen. The large-scale fantascopes were mounted at a high level enabling them to project in the middle of the screen no matter whether they were far from or near to it. The rear axle is slightly moveable because of mounting and tightening the leather strap. Last, but not least, I abandoned the electric controller and a diaphragm from a dismantled microscope condenser now regulates the light in front of the lens (of course a 'cat's eye' would be more sophisticated).

I apologise for the light source – it's not a candle, nor a moderator or Argand oil lamp and surely no limelight. But the electric light does bother me every time I have to use it. Maybe tomorrow I will have a suitable oil lamp to install