

# SOME ENGLISH MAGIC

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**This is going to be** a good old-fashioned lantern lecture – so you'd be better warned! I want to talk about some of the patent applications made between 1802 and 1896. From then on, applications for cinematograph apparatus swamped the few taken out for improvements in lanterns.

I have limited myself to magic lantern patents; for instance, patents for slides, carriers, moving picture machines and so on, are not included. (The bold numbers within parentheses refer to the illustrations.)

Perhaps we ought to, first of all, look at the total number of relevant patents issued between 1800 and 1896:

1802-1860	1860-1869	1870-1879	1880-1889	1890-1896
4	21	26	87	142

It is extraordinary that only four patents were issued in this country between 1802 and 1860 especially if we consider that almost everything that gave the magic lantern its character and stature: dissolving views, the lime-light, photographic slides, the opening of the Royal Polytechnic Institution (to name the very obvious) was introduced during these years. This was perhaps largely due to the patent laws, but it also seems to indicate that innovations made during that time were either thought not worth while patenting, or that no one person thought his own contribution as being sufficiently valuable to merit applying for a patent.

## PHANTASMAGORIA

The first patent is that taken out by PAUL DE PHILIPSTHAL in January 1802 for the Phantasmagoria.<sup>1</sup> It is only in hindsight that we know what Philipsthal actually did and what his shows were like. The language of the patent is so obscure that it is very difficult to draw any conclusion from it. At the time it must have been almost impossible. This is what the patent seems to have covered:

- 1 Projection of opaque objects and transparencies to be reduced or enlarged to facilitate the painting of pictures.
- 2 Phantasmagoria proper, that is to say, the showing of apparitions and ghosts by means of a lantern on wheels (something like the one shown in figure (1) and projecting them from the back to a translucent screen.
- 3 It is very probable that Philipsthal referred to superimposition effects (in the manner of Robertson's 'Bleeding Nun'). In that case, a double lantern (2) could easily have been used.

4 In addition, Philipsthal patented the projection of objects like articulated puppet-figures with which, he implies, entire pantomime scenes could be performed.

All in all (and in spite of the vague wording) the patent included all the tricks of projection, even a primitive kind of dissolving view superimposition effect, with which we are now familiar. Illustration (3) is a reproduction of part of the 1802 playbill for the Phantasmagoria. The text makes it fairly clear what the audience could expect:

*Phantasmagoria, this and every evening, at the Lyceum, Strand. M. de Philipsthal takes the earliest opportunity of informing his patrons and the public at large, that in consequence of some attempts to impose upon them a spurious imitation of his optical and mechanical invention, he has obtained His Majesty's Royal Letters Patent, under the protection of which he will have the honour to exhibit his Optical Illusions and Mechanical Pieces of Art.*

*The optical part of the exhibition will introduce the phantoms or apparitions of the dead or absent, in a way more completely illusive manner than has even been offered to the eye in a public theatre, as the objects freely originate in the air, and unfold themselves under various forms and sizes such as imagination has hitherto painted them, occasionally assuming the figure and most perfect resemblance of the heroes and other distinguished characters of past and present time. This spectrology, which professes to expose the practice of artful impostors and pretended exorcists, and to open in the eyes of those who still foster an absurd belief in Ghosts and Disembodied Spirits will, it is presumed, afford also the spectator an interesting and pleasing entertainment; and in order to render these apparitions more interesting, they will be introduced during the progress of a tremendous thunder storm, accompanied with vivid lightening hail, wind, &c.*

How do you follow that? Well, nobody did until 1855.

## SPARKHALL'S PATENT

In 1855 E Sparkhall patented idea of fixing a number of lanterns on conveyer belts (4) to project what were called 'moving panoramas' on to large screens to give the audience the impression of travelling past an ever-changing landscape.<sup>2</sup> The idea seems never to have been carried out but, considering the limited means,

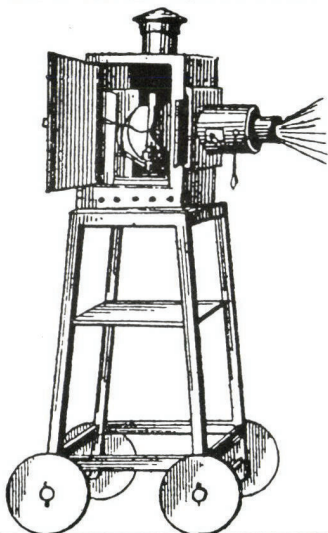
the solution was certainly a brilliant one: each lantern held a slide with a different 'slice' of the panorama and, as they travelled across the band, the scene moved. New slides could then be substituted and, in theory anyway, a long moving picture (I mean this literally!) could be projected.

Sparkhall also foresaw something which only just about now, using hologram projection, is becoming a reality and that is to provide a complete environment for the spectator who stands on a platform and watches a model ship vanish into the distance (5). The sky and the scenery on either side, in the tradition of the moving panorama, is in continuous motion. For the side-perspective-views the pictures could be projected using the conveyer-belt systems.

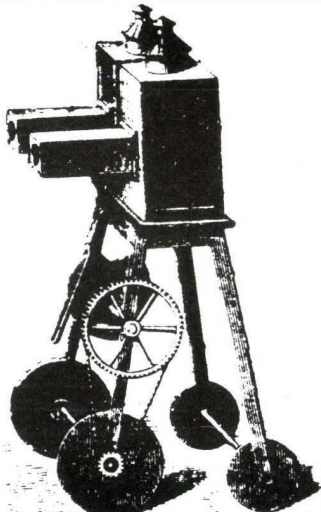
## ENLARGERS

It was not until 1857 that the first enlarger was patented by DAVID A WOODWARD<sup>3</sup> although projection apparatus for enlarging daguerreotypes was used soon after the so-called 'invention of photography' in 1839 and a number of instruments were developed for enlarging glass negatives prior to 1857. I mention this because for some reason, when we consider the history of the magic lantern, we tend to ignore the history of enlarging apparatus altogether. Woodward, in his patent for the so-called *Solar camera* (6) again took up Philipsthal's idea of projecting transparencies onto canvas as an aid to painters. As the name *Solar camera* implies, sunlight was used as a light-source and a heliostat was suggested to focus the sun's rays onto the negative. The heliostat is an instrument which once set, allows the mirror to follow the sun and to always reflect the light on to another mirror, like the one shown in Woodward's enlarger (A, figure 6). The use of sunlight for projection was proposed over and over again during the nineteenth century and as late as 1914 by Gage and Gage.<sup>4</sup> A heliostat from Moigno's *L'art des projections*,<sup>5</sup> roughly contemporary with the enlarger patents we are discussing, is shown in illustration (7).

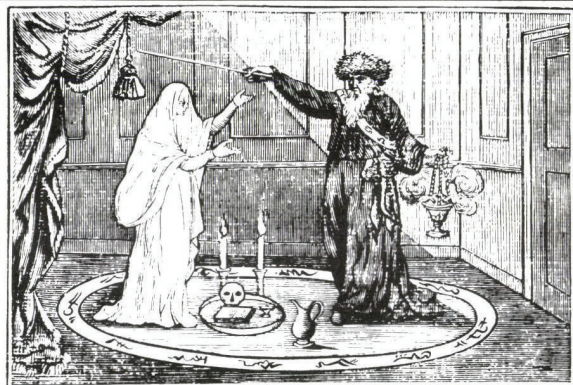
In 1864 two enlargers were patented, one by J ALPHONSE LIEBERT (8) which he proposed could be mounted on a heliostat (or as shown here with the sun shining straight into it).<sup>6</sup> At the Vienna photographic exhibition in 1864 showed an enlargement from carte-de-visite negatives, about 18 inches by two feet in size which took up to 70 minutes to expose; you can see how essential the heliostat really was.



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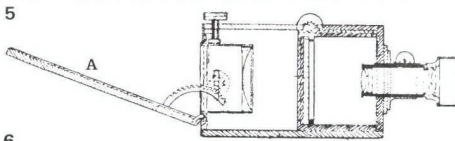
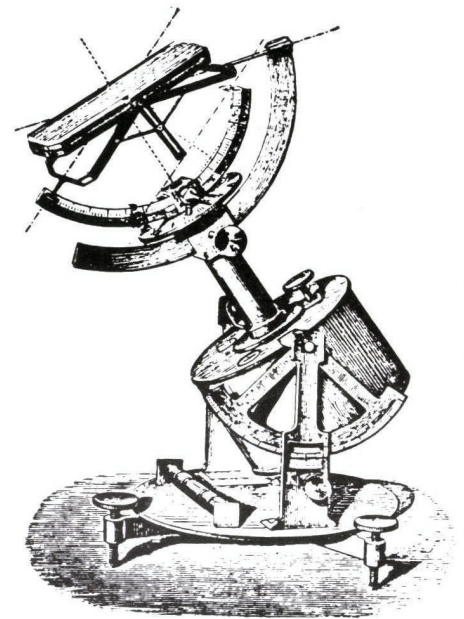
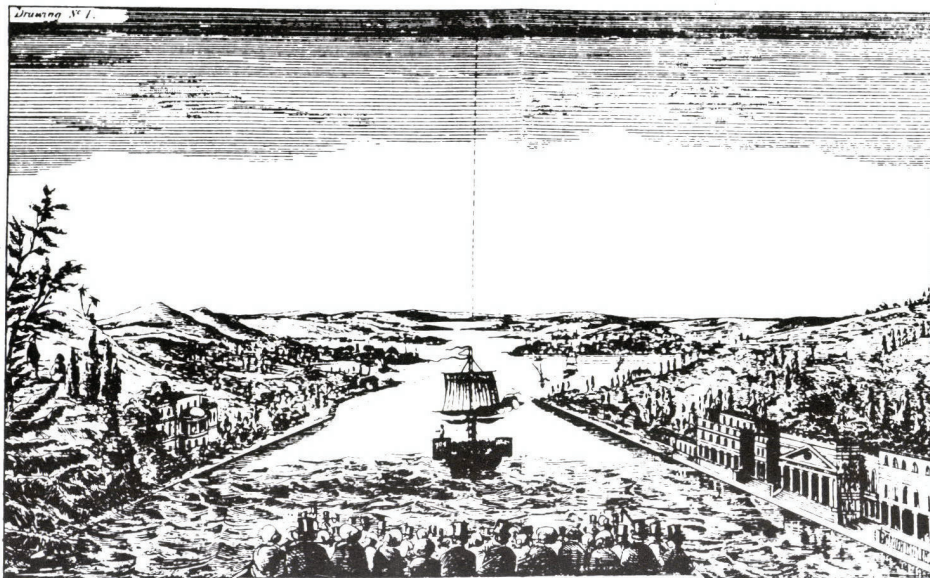
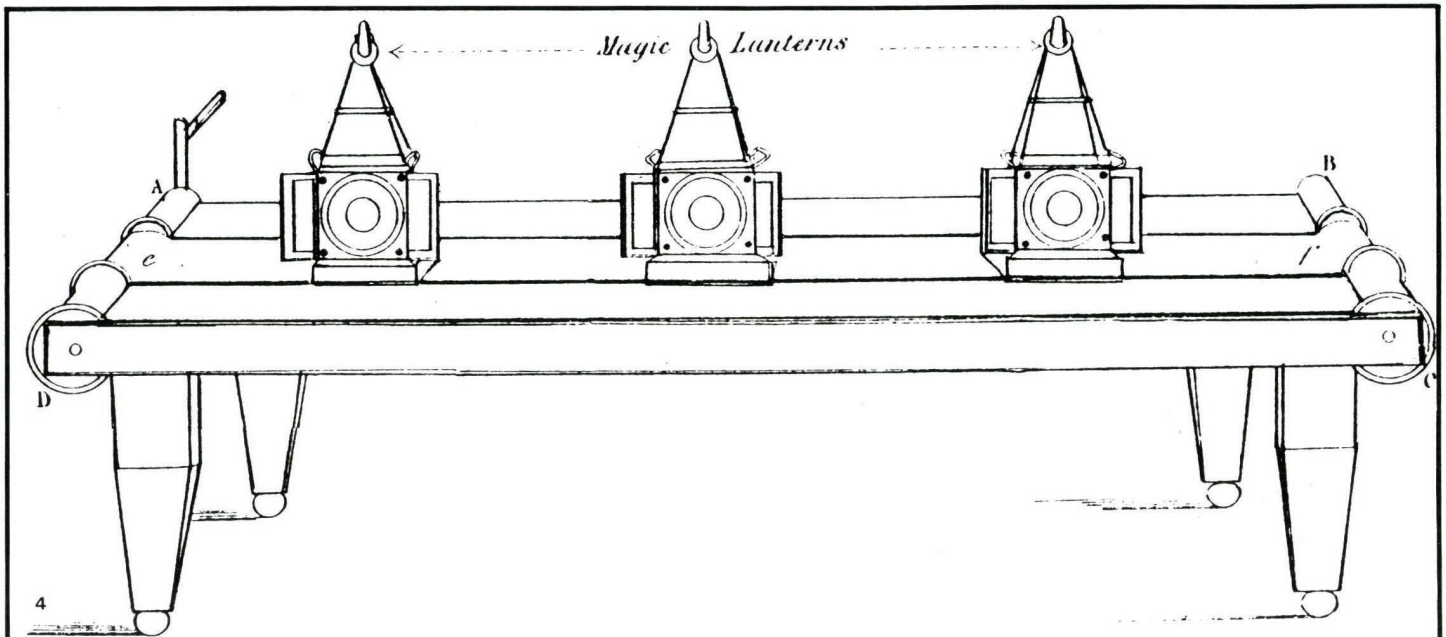


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PHANTASMAGORIA  
THIS and every EVENING,  
AT THE  
LYCEUM, STRAND. 3

# LANTERN PATENTS

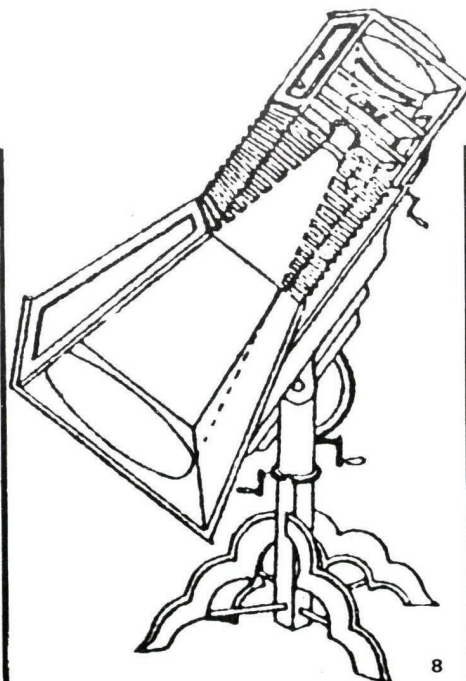


The other enlarger patented in 1864 was VAN MONCKHOVEN's,<sup>7</sup> again to be used with a heliostat. It is interesting to compare the patent drawing with the engraving showing the instrument when assembled (9).

## FIRST LANTERN PATENTS

Upto 1861 not a single magic lantern proper had been patented. In that year H A LEFEVRE applied for a patent for which he received only provisional protection.<sup>8</sup> It was for a casing to fit around an ordinary household oil-lamp; this casing is made to revolve (how, isn't made clear) and the pictures are then projected in sequence. This appears to be an improvement of the *Lampscope* lantern (10).

In 1866 FOURNET and NADAUD patented a lantern which was again reminiscent of the *Lampscope*.<sup>9</sup> This was really an attachment which could be fitted to any oil-lamp (11); what

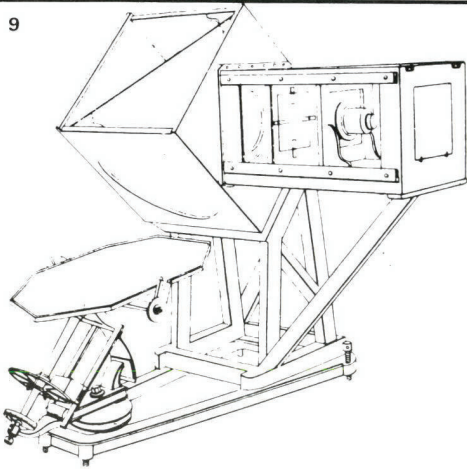


makes this patent so extraordinary is that it is the first one which describes in detail the actual workings of a condenser and projection lenses. Apart from being mentioned in the enlarger patents, these had never before been specified in a patent although, of course, common knowledge by then.

## OPAQUE LANTERNS

Early in 1868 a lantern for the projection of opaque objects was patented in this country by the German firm of KRUSS.<sup>10</sup> In this lantern (figure 12 shows a plan view of it) the pictures or objects are positioned at (A) on the inside of a little hinged door; the light from the lamp (B) and the reflector behind it is concentrated on the object by the condensers (C) and the picture is projected by the lenses (D). The little holes were for ventilation and the lines (E) indicate the housing for the lamp-assembly.

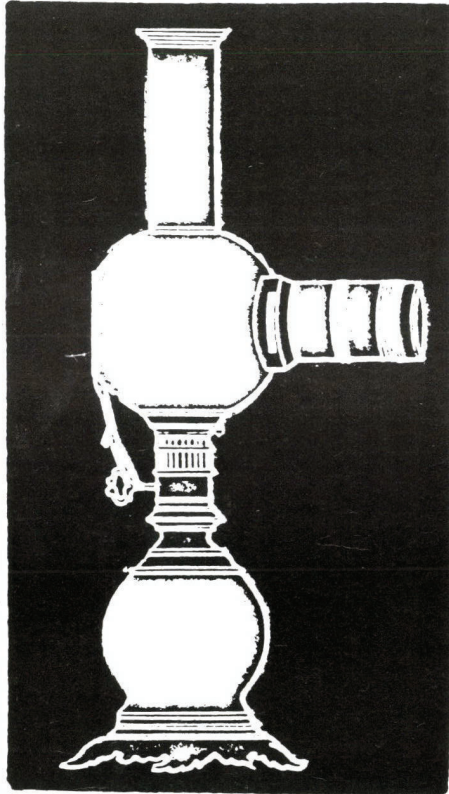
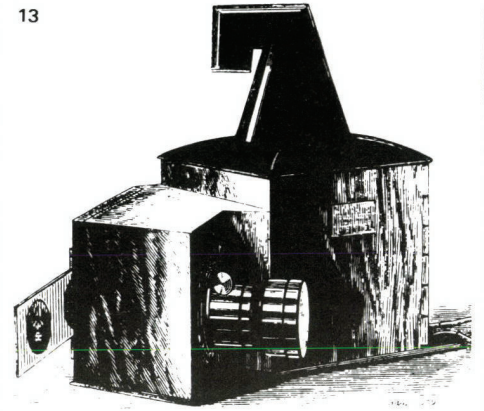
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The term *Wunderkamera*, anglicized as *Wondercamera* was given to this lantern and was later used as a generic term for any lantern which could be used for opaque projection.

I have already mentioned that Philipsthal included opaque projection in his 1802 patent and there seems to have been little, if any, development until 1832 when MILES MADDER described, what he called, his *Endless Magic Lamp*<sup>11</sup> which was a nice name for a lantern with which any kind of picture or small object could be shown. The first popular lantern for the projection of opaque objects which was commercially manufactured was the one constructed by CHADBURN & SONS of Liverpool in 1865 (13). It was first demonstrated at a meeting of the Liverpool Chemists' Association that year and I think it likely that publication of details of its construction in a German photographic paper in June<sup>12</sup> led the Krüsses to design their own. Chadburns' lantern seems to have been a better instrument altogether: the parts could be bought separately and assembled as shown (14) or one could attach ones own lantern (without the objective) to provide the light. Why this instrument was not patented and why the Krüsses thought it worth while to patent theirs in this country remains a mystery.

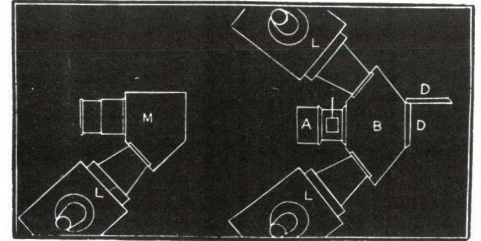
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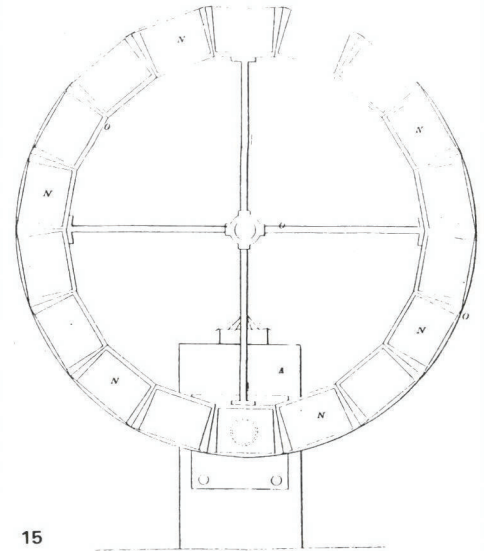
#### MECHANICALLY MOVED DISC LANTERNS

In 1870 J M A Lacomme, a doctor of medicine practising in Euston Street was granted a patent<sup>13</sup> which was the prototype of many of the lanterns patented later. He proposed to mount the slides on a very large disc positioned above the lantern (15) and to turn it by means of a clockwork motor intermittently so that the slides could remain on the screen for a predetermined period of time. Lacomme stated that the lantern was intended for showing advertisements either inside a building or on a screen positioned at right angles to the wall of the building (a sort of magic lantern hanging sign). He also suggested that it could be used inside a horse-drawn vehicle, and for decorating the front of theatres.

Lacomme also patented a mechanical ventilation systems (16), the first ever devised and probably the only one until the advent of the motor-driven fan. The ventilator is in the cowled chimney of the lantern and mounted on a spindle pivoted on the floor of the lantern; it is rotated by the heat from the lamp.

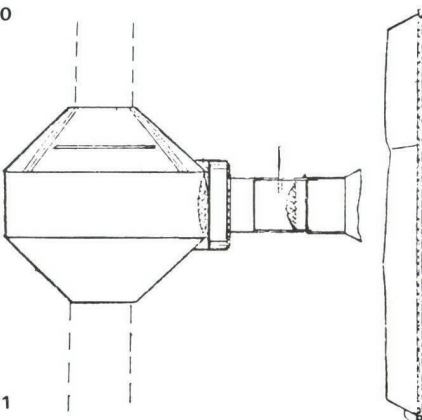


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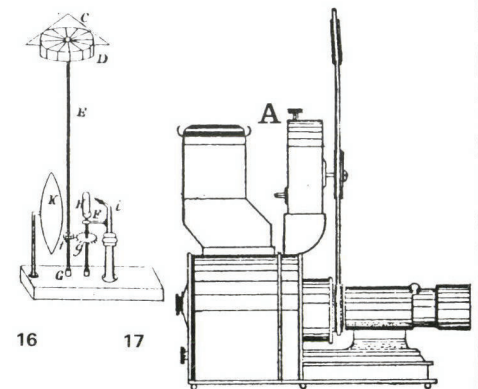
Another simple clockwork disc lantern (17) was patented by J T KEY in 1886.<sup>14</sup> This had the advantage that the movement of the disc could either be continuous at a previously specified rate or controlled manually by pressing the knob (A). Another one patented by J ROOTS<sup>15</sup> is shown in illustration (18). The revolving disc system did of course originate with ZAHN in 1685 (19); I think he would have approved!

#### DOUBLE-BODIED LANTERNS

In April 1872 A G BUSBY and the now famous WALTER B WOODBURY took out the first patent for a bi-unial lantern.<sup>16</sup> I need not describe it here since it contains all the familiar features of a bi-unial. There is no illustration because the patent was never completed and only received provisional protection. As with the *Wunderkamera*, the idea of a double-bodied lantern was not new but no English patent except this provisional application for it seems to exist; all later versions were simply improvements of an already well-established model.

#### SCIOPTICON

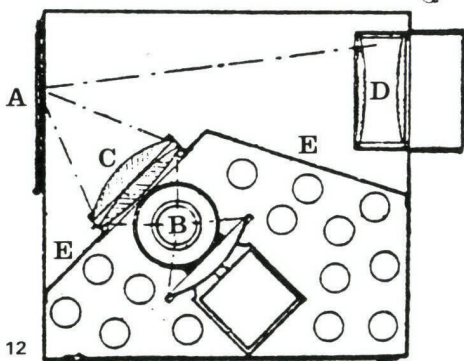
Although Woodbury's double-bodied was not new, the patent taken out by him a month later, in May 1872, for MARCY'S *Sciopticon* certainly was.<sup>17</sup> Or rather, it would have been had he



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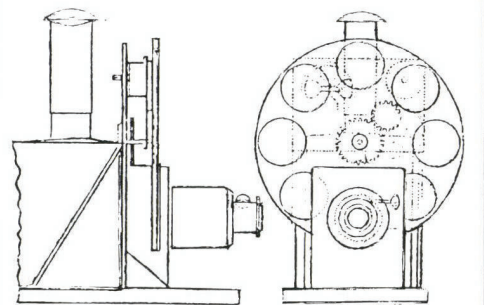
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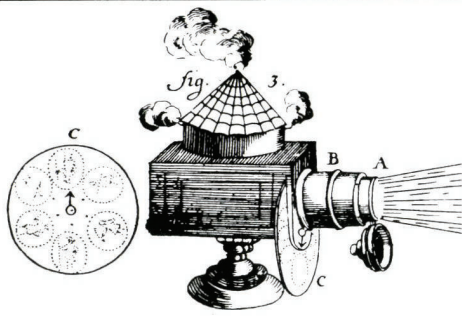
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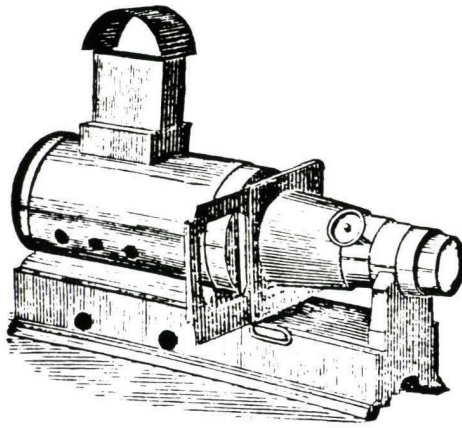




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completed it. Marcy's paraffin lantern (20) was first described in the *Journal of the Franklin Institute* in 1872 as: *the most satisfactory and convenient substitute for the oxyhydrogen lantern which has yet been devised.*

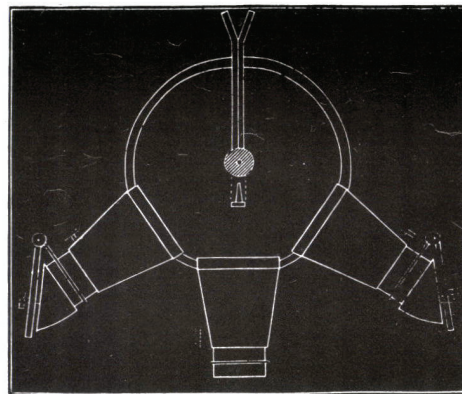
There is, unfortunately no room here to go into the history of one of the best and most popular lanterns ever produced, suffice it to say that for almost a quarter of a century it changed lantern projection completely and allowed many people to show large and bright pictures without any of the problems of having to install and operate a lime-light lantern. Later, Woodbury complained bitterly about the many imitations of the *Sciopticon*; he had of course not a leg to stand on since he never managed to complete the patent.



20

**SINGLE LIGHT-SOURCE DISSOLVING VIEW LANTERNS**

In 1877 H KEEVIL patented a single light-source dissolving view lantern<sup>18</sup> which became known as *Keevil's Patent Newtonian Lantern* (21). It had two optical systems; the light-rays from (A) go straight to the screen and the light from (B) is reflected by either a prism or a mirror attached to the lens so that the two pictures coincide on the screen. Registration is by means of a screw and spring with which the prism could be adjusted (the mirror could of course be tilted in any direction). This was, I think, a much more reliable way of obtaining exact registration and it is surprising that the concept wasn't developed further.

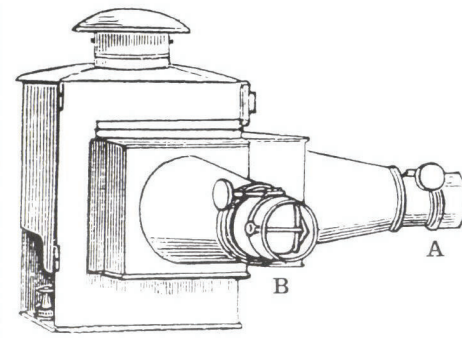


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Again, the idea was not new although the patent was the first of its kind. The Rev Canon BEECHEY as early as 1847 had constructed a lantern (22) which was exhibited at the 1851 Exhibition. This was a triple lantern (or rather, a single lantern with one light-source and three distinct optical systems). Prisms were placed on the two side projection tubes so that each picture could be superposed on the screen.

**PAVEMENT LANTERNS**

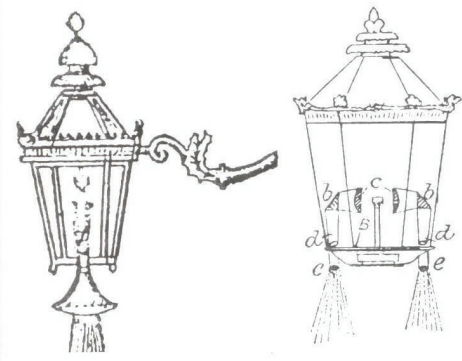
There is an endless series of jokes about patents and patentees, but on the whole there weren't all that many really nutty patents for magic lanterns. Among the few was one taken out by LACOMME and LEFEBVRE<sup>19</sup> for a magic lantern street gas-lamp (23) for projecting advertisements on to the pavement. It has the objective tube directed downwards and four transparencies are made to rotate by means of a clockwork motor between the lens tube and the gas-jet. What looks like a shower in the drawing is really the picture emerging from the lamp through a funnel. Much later, in 1892, another such projection arrangement was patented by E CHASSERAUX.<sup>20</sup> The illustration (24) is self-explanatory: the two prisms (A) reflect two slides on to the pavement.



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**TRAIN-DEPARTURE LANTERN**

The problem of indicating train departures in large stations occupied patentees for years (as it still does!). One solution was proposed by A W ARMSTRONG in 1888.<sup>21</sup> It is difficult to explain the complex projection systems (25): the slides showing the destination, departure times and platform are changed automatically by means of an electric circuit breaker. What Armstrong called an 'electric lighter' lit the gas jet every time a slide is changed. All this needs is a little electronic updating and we can do away with the mechanical and monstrous train indicating screens which make getting from Charing Cross to Croydon such an adventure.

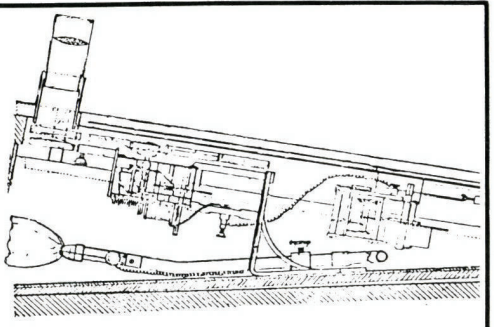


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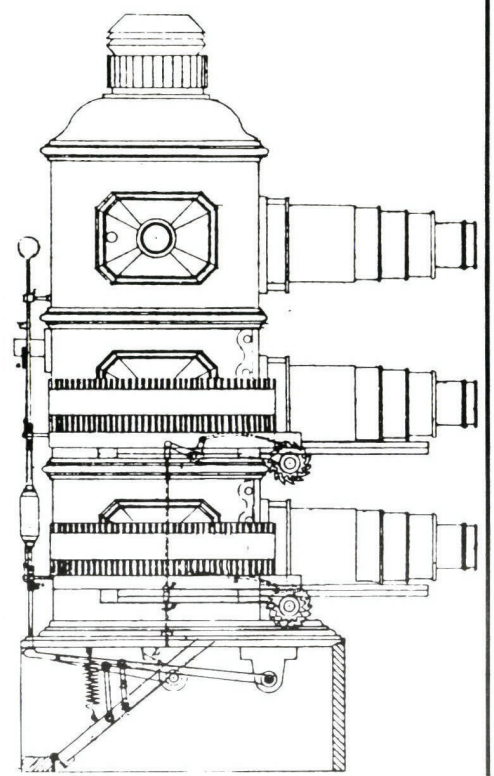
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**SLIDE CHANGING SYSTEM**

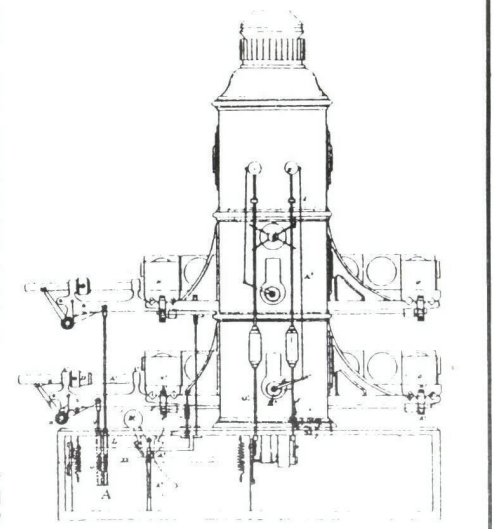
The ancestor of the modern 35 mm projector



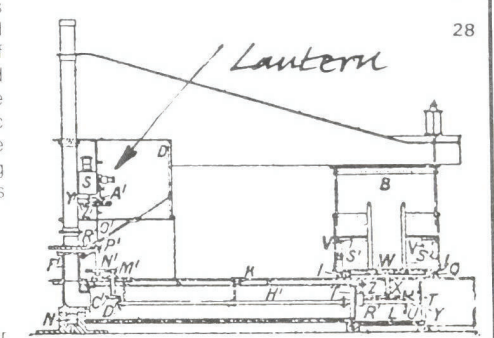
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with a slide-tray was patented in 1884 by W H DUNCAN.<sup>22</sup> In principle, this extremely well-designed and unique lantern was almost identical to today's projectors (26). The slides are placed in trays on one side of the lantern, pushed in by a lever mechanism and transferred into another tray on the other side of the lantern (27). At the same time the lime-light is turned down in one lantern and turned up in the other and the lime-cylinder is given a little turn. The top lantern is for special effects. The lantern was made by J H STEWARD and the system remained in use at least until 1898 when a description and photographs of it were published in the *Optical Magic Lantern Journal*.<sup>23</sup>

### MAGIC LANTERN ROUNDABOUT

Illustration (28) is confusing to say the least and the abridgment even more so:

*In connection with roundabouts of special construction, panoramic effects are exhibited at the centre of the apparatus. To revolve the panoramic screen D, the axle R is continued by the shaft H<sup>1</sup>, and by means of gearing D<sup>1</sup>, C<sup>1</sup>, M<sup>1</sup>, N<sup>1</sup>, and P<sup>1</sup>, the wheel R<sup>1</sup>, loose on a bearing F<sup>1</sup>, is rotated, and thereby the screen D<sup>1</sup>, which is attached thereto by the rod O<sup>1</sup>. On the screen the picture is thrown by a lantern S, which picture may be varied, if required, by means of friction-wheels Z<sup>1</sup> and Y<sup>1</sup> rotating the circular glass plate A<sup>1</sup> on which the series of pictures is painted.*

This patent by J BROMLEY<sup>24</sup> for a magic lantern roundabout seems wholly impractical, but the idea of sitting on your horse (or whatever) riding forever past a changing projected panorama is wholly delightful.

### BAND-STRIP PROJECTORS

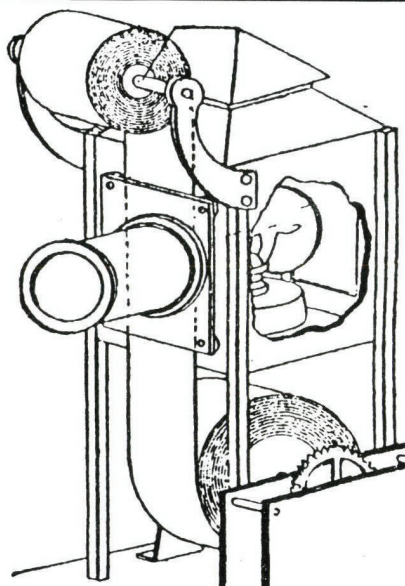
To get back to earth: in 1888 two patents were taken out which heralded the decline and fall of the magic lantern.<sup>25</sup> One was by E T POTTER for using a continuous band-strip which could be wound from one roller to another by means of a clockwork motor (29), the other was by W P ADAMS for an intermittent band-strip movement mechanism (30).

This, as Hopwood has pointed out, contained *in a crude form very similar features to the first workable living picture machine*. The short-sightedness of the editor of the *OMLJ* was such that when reporting the patent,<sup>26</sup> he altogether omitted to mention that Adams had specified celluloid. He also forgot to mention that FRIESE GREENE and MORTIMER EVANS's later patent (which is now considered by some to have been the first cinematograph apparatus) worked because they adapted Adams's movement mechanism. Be that as it may, Adams's instrument was certainly the prototype of present-day film-strip projector.

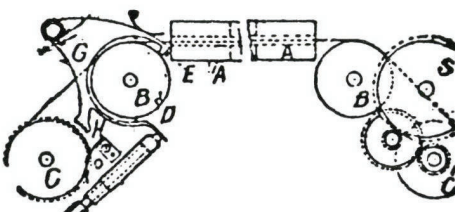
### 'VERTICAL' LANTERNS

1889 saw the first patent (by H C NEWTON)<sup>27</sup> for a lantern for projecting objects which can only be placed in a horizontal position (31). This lantern became known as *Newton's Vertical Bi-unial*: the top lantern can be tipped back so that it points vertically upwards and the objects laid on top of the condenser (A). The image, after passing through the objective was reflected the right way up by a mirror (B) on to the screen. In addition, the lantern could be used as an ordinary dissolving view lantern and for showing scientific experiments (a kind of optical bench).

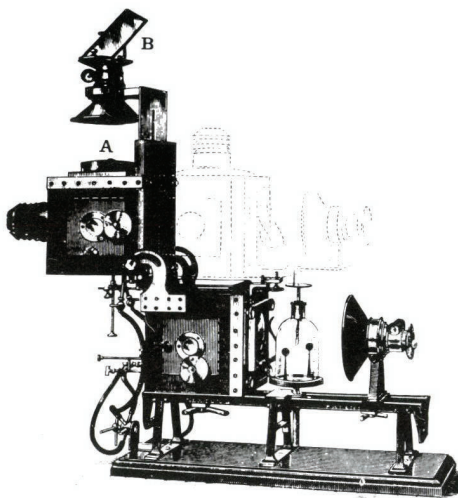
Yet again, this is the first patent of its kind but there is little new in principle; the earliest such arrangement (as a separate attachment to be used with any lantern) was designed by JULES DUBOSQ in 1868.<sup>28</sup> There were a number of patents for lanterns similar to Newton's, but none of them presented anything different or better.



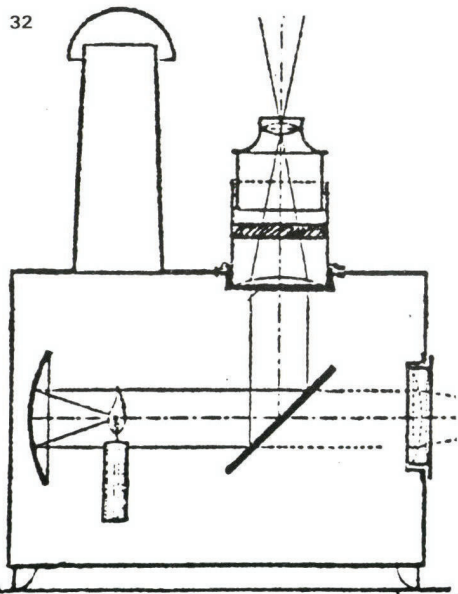
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These are also the origin of the nice toy lantern (32) patented in 1894 by FRANZ HEINRICH KLODT<sup>29</sup> for projecting slides on to the ceiling to entertain children when they were ill in bed.

### SINGLE-UPRIGHT LANTERN

A HUGHES in November 1889 patented an extremely well-designed and utterly un-Victorian lantern.<sup>30</sup> Hughes specified that the lantern should be made of aluminium, that instead of the usual brass-tubes, bellows should be used and that both lanterns when used for dissolving views should swivel on brackets attached to a single upright (33). By the way, this was not patented by Charles William Hughes whose firm was so well established that he could not possibly have considered such a revolutionary concept.<sup>31</sup>

### SINGLE-BODIED SIDE-BY-SIDE LANTERN

Another excellent design for a dissolving view lantern was patented that year by H BOND.<sup>32</sup> Two side-by-side lanterns are combined in one instrument which has a single light-source (34). The two optical systems each with a reflecting mirror, can be pivoted to allow the pictures to be superposed on the screen. The great advantage of it was, that the operator could work the lantern from the back in full view of screen. The lantern was manufactured by ARCHER & SONS of Liverpool.

### OPTICAL POINTER

1890 saw the introduction of an instrument we could all well do with. It is the so-called *Optical Pointer* (35) patented by D GRAVELL<sup>33</sup>; it does exactly what the name implies: a lecturer could turn it in any direction and at any angle to project an arrow on the screen. The weight at the end of the arm gave it a fine balance. The instrument was also manufactured by STEWARD.

### MORE SLIDE-CHANGING APPARATUS

One man in particular, H SIMPSON, occupied himself for years with designing (and patenting) complex slide-changing apparatus of one kind or another. With one collection of mechanical hardware (36) slides could be exchanged, dissolving screens opened and closed, and the lime turned, all at the same time. It would take too much space to explain how it worked (even if I understood it). Illustration (37)<sup>34</sup> shows another arrangement patented by Simpson where the slides are attached to an endless chain (instead of coming down a chute).

A somewhat later slide changing system which seems to have been quite successful both here and in Germany was incorporated into ALLEN's so-called *Magazine and Science Lantern* (38). This was patented in April 1895<sup>35</sup> and is to some extent similar to DUNCAN's lantern: the slides are stacked in a drawer and by turning a handle at the side of the lantern this happens: the shutter behind the lens closes, the slide just exhibited goes back into the drawer, this moves forward one notch, the next slide is pushed forward and the shutter is opened again. The lantern could also be used for vertical projection (39).

### SEARCHLIGHT LANTERNS

Most of us, when we think of magic lanterns, often forget some of the uses projection was put to (and still is, for that matter!). One example is an 1892 patent<sup>36</sup> for a battery of searchlights meant for military and not domestic use the whole structure could be mounted on a gun-carriage (40). Another searchlight was patented later that year<sup>37</sup> by E A SCOTT. He suggested a stencil plate made of asbestos or steel instead of a slide, and

wisely, a system for circulating water round them. This massive apparatus (41) which became popular about that time, especially in America, was used for projecting advertisements on to clouds.

In complete contrast is an absolutely crazy patent for a penny-in-the-slot magic lantern (42). You put your penny in and then pull the handle (X); you can then see a picture appear in the vase as if by magic. What is exceptional about the patent is that it is the first one I have been able to find, where an electric incandescent lamp is proposed as light-source.<sup>38</sup> Hidden away like this, nobody of course took the slightest notice.

I have covered about one hundred years of English patents: some were prophetic of what was to come, others were vain attempts to improve apparatus which, mostly because of commercial and vested interests, could not be improved. But all the gallant patentees, sitting up there in that special heaven for inventors of magic lanterns, will probably be very happy to see us all together here today. Many thanks to them and to all of you, of course, for allowing me to talk about it. I would like to leave you with this 1896 patent for an itinerant magic lantern sandwich-board man (43). That's where we came in!

Hermann Hecht  
London March 1981

NOTES

- 1 26 January 1802, no. 2575.
- 2 10 February 1855, no. 313
- 3 22 September 1857, no. 2459
- 4 Gage, Simon and Gage, Henry Phelps, *Optic projection*, 1914, Ithaca, New York
- 5 Moigno, l'abbé C.F.N.M., *L'art des projections*, 1872, Paris Gauthier-Villars et fils.
- 6 11 February 1864, no. 363. (The patent was filed by Count P.A. de Fontaine-Moreau.)
- 7 21 April 1864, no. 1000.
- 8 13 May 1861, no. 1218
- 9 27 November 1866, no. 3116
- 10 2 January 18 1868, no. 19.
- 11 Madder, Miles, 'Endless Magic Lamp', in: *The Mechanics Magazine* (London), 1832, vol 17, pp 17 & 18
- 12 *British Journal of Photography*, 1865, vol 12, p 78.
- 13 8 August 1870, no. 2202
- 14 13 May 1886, no. 6431
- 15 6 December 1889, no. 16,901
- 16 20 April 1872, no. 1186
- 17 22 May 1872, no. 1563. (The instrument is not named.)
- 18 8 June 1877, no. 2241.
- 19 17 December 1877, no. 4785.
- 20 14 July 1891, no. 11,969 and 6 September 1893, no. 16,785. The illustration is from the latter patent.
- 21 28 November 1888, no. 17,326.
- 22 8 January 1884, no. 934
- 23 Baker, G.R., 'Duncan's Mechanically-Moved Triple Lantern', in *The Optical Magic Lantern Journal and Photographic Enlarger*, 1898, vol 9, pp 7-9.
- 24 24 September 1886, no. 12,125.
- 25 Potter: 2 October 1888, no. 14,171. Adams: 19 November 1888, no. 16,785
- 26 *The Optical Magic Lantern Journal and Photographic Enlarger*, 15 November 1889, vol 1
- 27 15 August 1889, no. 12,913
- 28 See *The New Magic Lantern Journal*, January 1981, vol 2 illustrations p 6
- 29 18 January 1894, no. 1091.
- 30 20 November 1889, no. 18,583.
- 31 During the discussion after the lecture Mr. T. Dugdale mentioned that this (or a very similar) lantern had been offered to him for sale.
- 32 11 December 1889, no. 19,926.
- 33 15 August 1890, no. 12,841
- 34 Simpson's patents: 30 April 1892, no. 8185; 3 December 1892 no. 22,151; 3 March 1893, no. 4644; 15 December 1893 no. 24,135.
- 35 16 April 1895, no. 7656.
- 36 Patent by E CURTICE of 8 September 1892, no. 16,114.
- 37 20 September 1892, nos 16,806 and 16,806 A.
- 38 Patent by W W BAGALLY of 18 January 1895, no. 1149.
- 39 Patent by E SANDOW of 3 December 1896, no. 27,495.

Most of the illustrations are from the patent abridgments. I am very grateful to the staff of National Reference Library of Science and Invention (the good old Patent Office Library) for their help and patience.

