

BRITISH PATENTS RELATING TO SMALL TELESCOPES AND BINOCULARS

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compiled by Terence Wayland

DATE & No.	APPLICANTS	DESCRIPTION	COMMENT
1758 No. 721	John DOLLOND	The Achromatic Lens.	The application was contested by Dollond's competitors because he was not the inventor. The Court case created the precedent that it was the first to apply who was entitled to a Patent not necessarily the inventor.
27 April 1774 No. 1069	Thomas SHORT	A method of making reflecting telescopes with more than two speculums (mirrors) allowing the use of two eyepieces.	Modern versions are available

10 April 1778 No. 1252	William STORER	A new invention and discovery of certain properties in light and optical glasses, also of telescopes, microscopes, opera glasses etc. Which are rendered more accurate, more distinct and more luminous. A compact reflecting telescope can equal a larger reflecting instrument.	The actual means is not described, probably a better glass.
14 January 1782 No. 1316	Joshua Lover MARTIN	A new invented art of drawing tubes for the purpose of constructing telescopes, opera glasses etc. Sheet metal is formed into a tube and the ends soldered together. The tube is put over a mandrel and drawn through holes of different sizes according to the desired result.	Such machinery was still in existence in the basement of Broadhurst and Clarkson, Farringdon Road in the 1990's.
12 December 1783 No. 1407	William STORER	A method of preparing syllepsis glass and applying it to optick instruments including telescopes, microscopes and opera glasses.	Syllepsis glass was claimed to be superior to the improved achromatic lens.
26 April 1785 No. 1473	Robert BLAIR	Replacing the flint glass in the objective achromat with a fluid based on a metallic solution.	
4 August 1804 No. 2779	William WARRIS	An opera glass where nine circular segments collapse into the largest segment holding the objective.	

18 March 1806 No. 2918	Charles Robert WEST	The tubes of telescopes incorporate a bearing to keep the tubes parallel.	
23 January 1810 No. 3295	Joseph MANTON	Means of making, telescopes, and opera glasses airtight with joints sealed with greased leather, extra screwed rings and a valve through which the air is extracted.	Manton was a famous gun maker.
20 January 1815 No. 3876	Jean RONDINI	A means of varying the magnification through adjusting a combination of three or four lenses within the tubing.	
There appear to be no British Patents during this period but there was activity in Austria and France			
17 April 1852 No. 14070	A.V.NEWTON	An improvement in the manufacture of lenses by moulding techniques.	Newton was a patent agent
11 November 1853 1853/2608	Saloman STURN	Steam powered machinery for making lenses.	
21 March 1854 1854/665	William STEVENS	Lens grinding machinery with both rotary and vibratory movements.	

9 November 1854 1854 /237	Ignace PORRO	Certain applications of total or partial reflection of light on transparent surfaces either alone or combined with refraction. There were four application in all two of which are relevant. 1. two porro prisms are interposed between the object glass and eyepiece of an astronomical telescope to obtain a land telescope. 2. Three porro prisms are used. The first which has the objective attached reflects the light rays downwards to the second prism which is at 90 degrees to the first (and the third) . The rays are reflected up to the third prism (which is on the same level as the first but facing the opposite way) and thence to the eyepiece. Also with four prisms, two each side a small opera glass can be constructed, the magnifying power can be increased by adding lenses.	There are no illustrations with the patent. Examples of monoculars with both the two and three prisms systems were made by Hoffman and by Busch They were not successful because of the poor quality of the glass used for the prisms.
13 November 1856 1856/2674	Charles Wastell DIXEY	The connecting bars are bent to enable the eyepieces to be close to the eyes and facilitate clearanceof the nose.	

	A significant French Patent, there was no British application		
24 August 1859	A.A. BOULANGER	French Patent No. 41957 in respect of a new Binocular using Porro prisms. The prisms and eyepieces rotate about the axes of the objectives.	It was sold in Great Britain by Negretti & Zambra. There is an example in the Science Museum collection. The quality of the prisms and the manufacturing processes at the time were inadequate for the design.
4 November 1859 1859/2506	Aspull BINCKES	For opera glasses a system of levers that allow the objectives to converge or diverge according to the focussing.	
31 October 1863 1863/2699	Samuel Hickling PARKES	The use of rock crystal lenses or tinted lenses in eyepieces to reduce heat and irritation on the eyes.	
29 April 1865 1865/1205	Etienne BOUDRY	The fitting of a small extra lens to the eyepiece of opera glasses and telescopes to reduce the prismatic effect (colour fringing).	
31 March 1866 1866/920	William WRAY	An improved objective glass using three elements.	

?	Benjamin SOLOMONS	A means of fitting eyepieces by a bayonet	
1868/701	Albermarle Street, Piccadilly.	type fitting. The eyepieces being either ordinary or achromatic .	
2 February 1877	C. MOREAU	A mechanism for adjusting the distance	This system was used by
1877/442		between the two barrels of a binocular and focussing using racks and pinions.	Goerz on binocular telescopes and prismatic glasses. Negretti and Zambra sold models with this mechanism.
21 June 1878	T.J. POTTER	A telescope using porro prisms with lenses fitted to the prisms. The telescope is built into a tube. The cap at the eyepiece end is fitted with more than one eyepiece	The rotating eyepieces concept was used by Zeiss and Ross in the 20th Century.
1878/2478		the eyepiece is brought into use by rotating the cap.	
28 November 1882	W. MACK	A holder with a spring hook that clamps on to the central bar of an opera glass.	
1882/5654			
17 February 1887	F.J. BIGGS	The means of attaching a stop watch to a field glass by a band around the barrels.	
1887/2493			
12 July 1887	A.H. DOUGLAS-HAMILTON	In order to adjust the distance between the optic axes in binocular telescopes one or both of the tubes are mounted eccentrically in rings which can be rotated in their bearings.	
1887/9814			

12 December 1887 1887/17107	W.A.CARDWELL	A field glass constructed in a box like frame that collapses so it can be pocketed.	
29 March 1888 1888/4835	Dr.Heinrich Hugo SCHRODER 5 The Terrace Clapham Common John STUART The Hollies, Clapham Common	A design for a telescope where the magnifying power can be varied without greatly changing the length of the telescope.	This was the basis for a sturdy telescopic gunsight produced by Ross for many years.
7 April 1888 1888/5176	W.A. CARDWELL	An improvement on his earlier patent 1887/17107. A focussing mechanism works on the eyepieces.	
11 January 1889 1889/540	C.W.HOBSON	Consists of forming the lenses of opera field, marine and other glasses in an oblong,oval or square shape. Thereby allowing of a flat sided frame and providing light weight. in the drawing the lenses are hinged to fold together.	
25 January 1889 1889/1419	G.PLESSY	Relates to providing folding handles for opera glasses etc., with various means of attaching the handle to the glasses.	
26 March 1889 1889/5218	C.S.POCOCK	A collapsible field glass where the barrel bodies are made of a flexible material attached to a folding frame.	

27 March 1889 1889/5287	S.J.LEVI and E.CARRE	A mechanism for focussing field glasses The axis of the focussing wheel is at right angles to the spindle.	
16 April 1889 1889/6474	I.WEIL	The focussing spindle is contained within a larger diameter tube than is usual. it is closed at the bottom so as to form a container for salts or scent. A screw cap is fitted to the top.	
20 May 1889 1889/8378	W.SANDERS	A camera constructed in the body of a field glass.	This version cannot be used as a field glass.
21 May 1889 1889/8409	J.ANDERTON	A device consisting of two triangular prisms placed together, one base upwards, the other base downwards The second prism at rest has its rear face parallel to the front face of the first prism. The second prism can be tilted about its apex. This device can be placed before the objective of a telescope or field glass.	When at rest the image is not affected. If tilted the image becomes distorted.
13 August 1889 1889/12727	J.KORNBLUM J.A.BRASHEAR and P.PAINTER	Relates to fitting additional lenses into the eyepieces to provide correction for those users suffering from astigmatism. The extra lenses were mounted on small wheels in the eyepiece tubes. They were brought into use by rotating the wheels.	

8 April 1890 1890/5333	J.GREEN	A set of reflectors to be fitted to the front of a field glass. It allowed the user to also see what was behind.	
13 May 1890 1890/7448	J.GREEN	An improved version of patent 1890/5333.	
13 January 1891 1891/646	E.G.KING	A compass is fitted to a field glass so that magnetic bearings may be taken. The direction of view can be fixed by a set screw on the compass.	
20 January 1891 1891/1016	J.AITCHISON and T.BRADLEY	A design for an opera or field glass where the barrels are made of tapering spirals of flat steel. The bridges holding the eyepieces and objectives are brought together or extended by an X frame linkage with geared joints. The cells holding the tubes may be formed of aluminium lined with brass.	Sold by Aitchison in two versions, one with 6 lenses the other with 12
14 February 1891 1891/2725	W.SAUNDERS	A photographic camera made in the form of a field glass.	This model can be convertible between being a field glass and a camera. Ross offered a version as the Photoscope.
7 April 1891 1891/5922	C.S.POCOCK and A.W.POCOCK	A collapsible field glass where the bodies are of a flexible material fitted over a spiral wire frame.	

24 September 1891 1891/16223	C.A.BOULTER	Consists of providing field glasses with spectacle sides and a nose piece to support them without using the hands. Additional support can be provided by cords or rods secured to headgear or part of the clothing or by counterweights over the ears.	
28 October 1891 1891/18598	E.LUDDECKENS	The provision of small curved plates to act as nose and finger rests.	
11 December 1891 1891/21716	E. and P. FRANCK - VALERY	Relates to a photographic camera which when folded up can be used as a case for an opera glass.	
8 October 1892 1892/17994	H.D.TAYLOR	A design for a three element lens to obtain very perfect achromatism in the objective of a telescope. The material for the lenses is specified from glass made by the SCHOTT (Zeiss) glassworks.	Of T.Cooke and Sons Ltd.
8 November 1892 1892/20137	H.M.CLARK	A field glass without any bodies. The lenses are fitted to plates. Focussing is achieved by adjusting the distance between the plates.	
19 July 1893 1893/13988	H.A.SAWYER	A design for field glasses in a narrow flat body. Also for provision of spring loaded eyepieces in conventional field glasses.	

24 February 1893 1893/3954	R.H.BUTTERWORTH	A combined opera glass and camera. One eyepiece is replaced by a unit with the lens and shutter. The photographic plate is fitted in a holder over the objective end.	
6 March 1894 1894/4735	W.H.WOOD	A combination field glass, stereoscope and photographic camera. As a stereoscope transparencies fit into diaphragms within the body tubes. As a camera the objective is replaced with a lens and shutter. Focussing is achieved by fitting a ground glass into the other body.	
17 March 1894 1894/5639	FIRM OF CARL ZEISS	The construction of two telescopes combined to form a binocular in a more convenient form to those with two parallel tubes. Porro type prisms are used to provide an erect image.	The illustration with the patent shows two arms with a hinge at the eyepiece end. The arms can be used as a binocular periscope in a vertical position or they can be lowered until they are at 180 degrees. In this position the instrument gives an enhanced stereoscopic effect.

21 April 1894 1894/7942	FIRM OF CARL ZEISS	A binocular telescope using porro prisms where the objectives are spaced at a greater distance apart than the eyepieces thus enhancing the stereoscopic view.	The illustration with the patent shows a drawing of the first Zeiss prismatic binocular and several combinations of porro prisms. This patent remained in force until 1908 and prevented other makers from placing their objectives further apart than the eyepieces unless they purchased a licence from Zeiss. No company in Great Britain did so. In the U.S.A. Bausch & Lomb did also Krausse et Cie in France.
20 October 1894 1894/20054	E.BLOCH	Opera glasses built on an open wire frame. At rest the lenses lie flat. In use the frame is extended and the lenses folded to face each other.	
16 November 1894 1894/22211	W.H.HARVEY	A design for a collapsible field glass made on folding plates.	

1 August 1895 1895/14598	W.EDWARDS	a design for collapsible opera glasses The eyepieces are fitted to one plate and the objectives on another. The bodies between the plates are of fabric over a spiral wire spring.	
6 November 1896 1896/24883	J.AITCHISON	An improvement on his earlier patent 1891/1016. The bodies are dispensed with and the two frames carrying the lenses are connected by four hinged arms that allow the field glass to be collapsed flat when not in use.	
9 June 1897 1897/14102	H.L.HUET	Relates to designs of prisms and combinations of prisms suitable for use in stereoscopic cameras. But could be applied to binocular telescopes.	

20 August 1897 1897/19255	John Henry BARTON 19 Honeywell Road, Wandsworth Common	A design for a binocular telescope where the two bodies carrying the lenses and prisms are mounted between two bars. The bodies rotate about the axes of the objectives. The amount of rotation (to obtain the correct interpupillary distance) is limited by curved arms at each end of the bodies. These arms are geared together to equalise the amount of movement.	This was the design for Ross Ltd.'s first prismatic binocular. The only difference in production models was that the gear teeth on the curved arms were replaced by a simpler and more robust hinge. On 13 December 1898 the patent was amended to show John STUART M.D. of Ross Ltd as a co-applicant. The design did not infringe the Zeiss patent
31 December 1897 1897/30925	H.L.HUET	A development of patent 1897/14102. Prisms specifically for binoculars. One gives a highly stereoscopic effect with the objectives more widely spaced than the eyepieces. The other can be used in an instrument that appears to have a straight through effect.	The prisms are both of complicated forms. The first provided a stereoscopic alternative to Zeiss. The second can be considered an early roof prism.
17 February 1898 1898/4007	O.SCHAFFHIRT	A collapsible opera glass. The frames holding the lenses are connected by collapsible bellows linked by four folding arms.	

28 February 1898 1898/4886	H.M.CLARK	A means of fitting to an opera glass clips that fit over the ears and nose clip so that they can be used hands free.	
28 April 1898 1898/9805	H.L.HUET	Prisms of an irregular tetrahedron or pyramidal block. A pair will give complete reversal without having to be at right angles as in the porro system. This allows for a flat instrument with a stereoscopic effect.	Another means of avoiding the Zeiss patent.
19 July 1898 1898/15806	M.HENSOLDT	A prismatic system combining pentagonal and porro prisms	
13 December 1898 1898/26354	J.AITCHISON	A means of adjusting the distance between the eyepieces. The objectives and the eyepieces are mounted eccentrically in barrels which are geared together so as to turn simultaneously and move the eyepieces closer or further apart.	
20 December 1898 1898/26917	V.G.RABASA & V.GALATAYUD	The tubes of binoculars are made in disconnectable sections. and the eyepiece distance can be adjusted by a rack and pinion.	The illustration shows non prismatic binoculars of considerable length.

1 April 1899 1899/6962	J.H.STEWARD	Relates to a rack and pinion mechanism to adjust the distance between the bodies.	This was a refinement on Moreau's patent 1877/442 A prismatic binocular with this system appeared in J.H.Steward's catalogue.
26 July 1899 1899/15376	John STUART and John Henry BARTON	In this design the top and bottom plates of a prismatic binocular are either extended to form the arms of a hinge or the arms can be separate and screwed to the plates.	This design was used on Ross Ltd's second series of prismatic binoculars. The idea was used by other british makers.
9 August 1899 1899/16217	C.P.GOERZ	A design for the bodies of prismatic binoculars where the eyepieces and objectives are mounted on internal supports to increase robustness.	
31 August 1899 1899/17641	H.D.TAYLOR	An eyepiece for use in low power telescopes, single or binocular. The design gives a wider field in Galilean instruments and could provide variable magnification.	Taylor was a Director of T.Cooke and Sons Ltd.
27 October 1899 1899/21480	J.AITCHISON	The design of a sub frame which is inserted into the binocular body to hold the prisms. This facilitates removal for cleaning and adjustment.	

22 November 1899 1899/23300	A.A.COMMON	The mounting of an objective lens in a circular cell with the lens set slightly off centre. When the cell is rotated the lens moves eccentrally. Thus providing a means of collimation.	
January 4, 1900 1900/256	H.L.HUET	A design for a binocular using the prisms described in patent 1898/9805. Unusually the design is not symmetrical. The objectives are both displaced in the same direction. A rack and pinion mechanism is used for adjusting the distance between the eyepieces.	In the patent drawing the objectives are displaced to the left of the eyepieces.
January 27, 1900 1900/1772	C.P.GOERZ	A design for a centre focussing mechanism where the centre spindle operates on rods within the bodies which in turn move the eyepieces up or down.	
April 30, 1900 1900/7973	J.H.BARTON	A design for a hinge made from two forked lengths. The bodies are secured between the arms of the hinge by screws.	Of ROSS Ltd.
July 11, 1900 1900/12538	John STUART of ROSS Ltd. and James William HASSELKUS	A design for a centre focussing mechanism that can be easily removed to allow the instrument to be adjusted for coincidence of the images.	The date 11-7-1900 is often engraved on the hinge arms of Ross Ltd's second series prismatic binoculars.

September 24, 1900 1900/16996	ROSS LTD. On the basis of a communication from WARNER & SWASEY of Cleveland, Ohio.	The provision of a means whereby the adjustment of prisms is facilitated and where the prism can be securely fixed in place by a projection into a groove cut in the prism. The projection is held in place by a small screw.	Warner and Swasey made a prismatic binocular very similar in form to Ross Ltd's second series. It remained in production until the 1st World War.
February 12, 1901 1901/2951	J.H.BARTON	A design for a metal casing to contain a prism to prevent the accumulation of dust or moisture on the prism.	Of ROSS Ltd.
February 16, 1901 1901/3396	P.JACQUEMIN	A design for a non prismatic field glass. The bodies and the centre focussing spindle are made of three sections that collapse telescopically.	
March 11, 1901 1901/5146	C.P.GOERZ	A design to make prismatic instruments more accessible for cleaning without disturbing the optical adjustments. The prisms, eyepieces and objectives are fitted to a subframe which can be enclosed within an outer casing.	The Goerz Pernox model that came out in 1902 uses a similar subframe for the prisms.
March 11, 1901 1901/5147	C.P.GOERZ	For use on eyepiece focussing models. A collar around the eyepiece can be rotated to move the eyepiece up or down without itself rotating.	

September 18, 1901 1901/18667	John STUART M.D. of ROSS Ltd. John Henry BARTON and John William HASSELKUS	A design for a support for a prism that allows for a degree of adjustment without packing pieces. Also the prism can be secured in its desired position.	Examination of early Ross binoculars shows that slivers of thin card were used as wedges under prisms.
January 18, 1902 1902/1443	J.AITCHISON	For non prismatic binoculars a design in which the two main conical tubes with top and bottom plates are cast in one piece. The eyepiece tubes are also to be cast in one piece.	
May 21, 1902 1902/11588	J.AITCHISON and C.V.DRYSEDALE	An apparatus for testing the magnification, and the angle of view of telescopes, opera and field glasses.	
November 27, 1902 1902/26169	J.AITCHISON	A design for a prismatic binocular where the prisms are placed close together preferably cemented. A field lens can be cemented to the combination. Also the types of glass used are specified and types of lenses. The specification also calls for a large objective. A barlow lens can be included.	The drawings show the objectives apparently constructed as a single unit as patent 1902/1443 The prism bodies rotate on the objective unit.
January 31, 1903 1903/2363	J.AITCHISON	A development of patent 1902/26169 where a focusing mechanism operates on the objectives.	

April 2, 1903 1903/7664	J.AITCHISON	A further development of patent 1902/26169 where the objectives are equipped with iris diaphragms controlled from the focussing spindle.	Aitchision sold several versions with up to 40mm objectives. The largest on prismatic binoculars at that period.
September 3, 1903 1904/4701	OPTISCHE ANSTALT GOERZ AG	A focussing mechanism that allowed for both eyepiece and centre focussing.	
October 1, 1903 1903/21120	John STUART M.D.ROSS LTD. and John William HASSELKUS	Improvements to patent 1888/4385 with reference to the cross wires re collimation and resistance to recoil.	
November 2, 1903 1903/23760	G.FOURNIER	A design for a folding binocular in the form of a handbag. When opened the objectives tilt to come into use.	
1903/28027	L.C.M.BALBRECK		
March 8, 1904 1904/5727	P.F.PUETZ	A design for a prismatic binocular using a combination of prisms that give a straight through effect.	The German firm Schutz of Kassel made binoculars of this pattern under their own name and for others such as Aitchison.

September 19, 1904 1904/20164	J.AITCHISON	A design for a mechanism where the distance between the eyepieces can be adjusted by rotation of the complete prism and eyepiece unit.	Both left and right sets of optics was contained in one box.
March 2, 1905 1905/4366	J.AITCHISON	A design for objective lenses using four elements giving improved performance	
July 25, 1905 1905/15318	Carl HENSOLDT	A design for prismatic binoculars using roof prisms	
August 8, 1905 1905/16125	John Henry BARTON	A design for a Galilean type field glass having two powers of magnification. This was achieved by having two eyepiece lenses mounted on a pivot.	
August 9, 1905 1905/16241	John Henry BARTON	A design for prismatic binoculars making the interiors were more accessible for cleaning. The body sides were detachable.	
September 23, 1905 1905/19268	John Henry BARTON	A design for mounting each prism inside a metal container . Each container being attached to either the top or bottom plates The mounts incorporate screws to allow adjustments.	This is a development of patent 1901/2951
September 23, 1905 1905/19270	John Henry BARTON and Ernest Albert CHAPMAN	The top and bottom plates are recessed where the bodies meet the plates. This was to improve dust proofing.	

December 1, 1905 1905/24971	RATHENOWER OPTISCHE INDUSTRIE - ANSTALT VORM EMIL BUSCH A.G.	A prismatic binocular with two sets of objectives lenses giving different powers. The objectives are set in tubes that can rotate within the main bodies.	
February 19, 1906 1906/4089	John Henry BARTON	A means of central focussing applicable to both galilean and prismatic binoculars. The main improvement is the removal of 'backlash' in the gearing mechanism. One application shown has arms from the spindle going into the bodies to engage with the eyepieces.	This application was used on prismatics bearing the Dollond name.
July 10, 1906 1906/15605	James AITCHISON	A design for a hinge formed from circular projections on the sides of the binocular bodies.	Aitchison sold models of this construction.
August 3, 1906 1906/17531	James AITCHISON	A design for opera glasses fitted to a frame similar to a pair of spectacles.	

October 23, 1906 1906/23568	Ferdinand PUTZ of OPTISCHE WERKE Cassel, CARL SCHUTZ AND CO.	A design for a binocular based on the prisms shown in Patent 1904/5727.	Appears identical with a binocular sold in the United Kingdom under the name LUMEX. It was advertised in the 1907 Army and Navy Catalogue.
February 4, 1907 1907/2722	Jacob HECKEL (of Carl Zeiss)	New methods of effecting collimation of the optical axes of prismatic binoculars. One method involves a means of adjusting the eyepieces or objectives by way of set screws. The other by mounting the objective in an eccentric.	An earlier patent 1899/ 23300 had used eccentric mounting but only in a monocular telescope.
October 17, 1907 1907/22933	Ernst LEITZ	A means of achieving collimation of the optical axes by adjusting the prisms using screws accessible through the top and bottom plates.	
December 9, 1907 1907/27214	OPTISCHE ANSTALT C.P.GOERZ	A design for a prismatic binocular with the eyepieces inclined at an angle to the main bodies. The bodies are hinged and fitted with central focussing. The eyepieces are so fitted that when the bodies are adjusted about the hinge they remain parallel.	

January 27, 1909 1909/1966	CARL ZEISS	A design for eyepieces both mounted in eccentric mountings on a single plate. A change in the interpupillary distance is achieved by a rack a pinion operating movement of the eyepieces in the mountings.	
March 18, 1910 1910/6880	John Henry BARTON	A design for a folding prismatic binocular. Each eyepiece and objective complete with a porro prism is contained in an 'L' body. The eyepiece units are connected to a centre focus spindle. The objectives units are fitted to the eyepiece unit so that they can rotate and lie flat for convenient travel or be at right angles for use.	A model to this design was sold by Negretti and Zambra as 'The Folding Minim' for many years.
December 9, 1910 1910/28626	CARL ZEISS	A means of collimating the optical axes of binoculars by means of an eccentric cap within the hinge mechanism	
January 2, 1912 1912/195	OPTISCHE INDUSTRIE GESELLSCHAFT MIT BESCHRAENKTER HAFTUNG	A means of adjusting the position of the prisms by means of screws accessible through the top plates.	
July 20, 1912 1912/16918	CARL ZEISS	A means of focussing both eyepieces together by adjusting only one eyepiece. The eyepieces are connected by a jointed bridge.	

May 19, 1913 1913/11633	John Henry BARTON	A design for a folding prismatic binocular The optical system is more complex than in Patent 1910/6880. In the drawings the eyepieces are at a fixed separation. The objectives appear square.	
December 24, 1913 1913/14913	Ernest Albert CHAPMAN and Frederick William WATSON BAKER	A means of adjusting the prisms by means screws through the bodies acting on the prisms or prism holders.	Of W.Watson and Sons Ltd.
October 28, 1914 1914/21681	John Henry BARTON	A design mainly for opera type glasses where the hinge is so formed that when folded the glasses are almost flat.	
December 9, 1914 1914/23825	Ernest Albert CHAPMAN and Frederick William WATSON BAKER	A design for precision castings forming the binocular bodies. This eliminated much of the machining previously required. The prisms are secured in place by flat springs and can be adjusted.	Of W.Watson and Sons Ltd.
August 3, 1917 117847	Ernest Albert CHAPMAN and Frederick William WATSON BAKER	The forming of binocular bodies from sheet metal so that the body has one closed end. Holes of suitable sizes are cut to accept the insertion of prism and lens.	Of W.Watson and Sons Ltd.

Yearly numbering had been replaced by continuous consecutive numbering			
April 9, 1919 135752	John Henry BARTON	A design for a prismatic binocular where the interpupillary distance is altered by means of a central pinion working on racks attached to the bodies. There are two wheels on the central spindle, one for focussing, the other for the interpupillary distance.	
June 13, 1919 141961	John Henry BARTON	A design for a prismatic binocular where each side uses a combination of three porro prisms cemented together. The bodies are mounted on rigid steel arms extending from a central block. The focussing and the interocular distance was operated by a mechanism based on Patent 135752.	A prismatic binocular was made to this pattern by the Barton Linnard Company. It was named the BRITANNIC of 6 X 21 specification. On 13 January 1921 J.H. Barton demonstrated the binocular to the Optical Society.
March 4, 1919 147629	Otto SCHNACK	A design for adjusting the prisms of binoculars from grub screws accessed from the top plate. The ends of the screws engage in holes in a cross piece which bears on the prism.	

April 25, 1919 148621	Per Johan BERGGREN	A design to enable the parts of prismatic binoculars to be readily assembled or taken apart. The prisms are mounted in a holder of sheet metal. Adjustments to the prisms are made by bending lugs on the holder. The main bodies are also made from sheet metal.	
April 25, 1919 148728	Per Johan BERGGREN	An addition to Patent 148621 regarding the eyepieces. To be formed from sheet metal. The inner tube has a cam groove cut into it. The outer tube has a pin which engages the groove.	
August 28, 1919 151452	A.BAUMANN	A design for a compact prismatic binocular.	The Nikon Mikron follows this concept.
April 19, 1920 158481	William Ross HAM	A design for a prismatic binocular claimed to give a much higher degree of light transmission than generally available. The optical system has the objective, a roof prism, a lens and pentagonal prism all cemented together. The eyepiece shown has four elements.	The patent claims light transmission of 65 to 70% compared to 40% in ordinary binoculars.

June 10, 1926 274616	BARR AND STROUD LTD. Harold Drinkwater JACKSON James Weir FRENCH	A design where the binocular or telescope body has one aperture through which the prisms can be inserted. The aperture can be on the top, bottom or side of the body. The prisms are in holders which may be adjusted for position.	
July 6, 1926 275389	Mark Herschel TAYLOR and KAPELLA LTD	A design for a Galilean binocular. An outer body is made from sheet metal. An inner tube also produced from sheet metal can carry either the objective or eyepiece lens. The inner tube has an arm projecting through a slot in the outer tube. The centre focussing wheel directly engages the projecting arms.	Taylor, Taylor Hobson Ltd made a binocular to this pattern. The bodies and focussing mechanism were of brass finished in black. It was of 6 X power.
January 24, 1928 301672	John William HASSELKUS	A means of improving light transmission through a prismatic system. This is achieved by fusing or welding prisms together and additionally attaching a lens directly to a prism by fusing or welding.	The patent claims an improvement from losing 40% to 28%. The Ross Stepnite and the military version No.5 models incorporated this application. The idea of combining a lens with a prism was envisaged by Porro in his patent 1854/237

April 30, 1928 308503	John William HASSELKUS and Harry MOORE	A glass plate is placed between the prisms. They are then cemented, fused or welded together. The plate is capable of rotation in its mounting. Various screws provide for adjustment of the plate and locking it in position.	Of ROSS Ltd.
June 7, 1928 313126	CARL ZEISS	The fitting of special eyecups to make the binocular usable by someone wearing a gas mask. They can be replaced with more normal eyecups as needed.	Though not claimed in the patent the eyepieces must have possessed long eye relief.
September 19, 1929 339986	Henry Beresford MOORE	A opera glass that can be worn like a pair of spectacles. The lenses can focussed individually. The lenses can also be reversed.	It is claimed that one benefit of reversing the lenses is that the user sitting in the front seats at a cinema would gain the imprssion of being in the expensive seats at the rear.
December 9, 1930 360238	BARR and STROUD LTD and J.W.FRENCH	A binocular sighting device with one fixed telescope and one capable of movement without rotation.	Not for hand held use
December 10, 1930 361650	BARR and STROUD LTD and J.W.FRENCH	A design for an optical observation unit where the eyepiece is at an inclined angle to the objective. One roof prism is used extended from the objective to the eyepiece. The lenses can be cemented	Not specifically for binoculars

		to the prism.	
!3 January 1931 362725	BARR and STROUD LTD and J.W.FRENCH	A means preventing access to air or atmospheric moisture at the eyepieces of optical instruments by fitting a flexible sleeve either externally or internally.	
March 16, 1931 367592	BARR and STROUD LTD and J.W.FRENCH	A means of maintaining the parallelism of inclined eyepieces in binoculars.	The drawings suggest that it is not intended for hand held binoculars.
July 8, 1931 376495	BARR and STROUD LTD and J.W.FRENCH	A design for a faceguard of a flexible material that can be fitted over the eyepieces without restricting their movements.	
March 2, 1933 410292	Norman KERSHAW and SOHO Ltd.	A design for a galilean opera glass.	Of A.Kershaw and Sons Ltd
May 27, 1933 416359	BARR and STROUD LTD and Charles Dalrymple MACGILL	Two tubular sleeves containing a number of links of a flexible metal. Each link is connected to each tube and the links overlap. When the outer tube is turned in one direction the links open out to form a longer tube. When turned back the long tube collapses.	Used to form sunshades on Barr and Stroud binoculars.
December 23, 1933 430826	BARR and STROUD LTD and John Martin STRANG	A means of making components inside optical instruments controllable through the use of magnets. This would allow	In binoculars filters and focussing could use this mechanism.

		better sealing of instruments.	
January 12, 1934 431692	BARR and STROUD LTD and J.W.FRENCH	A design for light filters, where the filters are placed between the prisms and eyepiece. The filters are set in a circular holder that can be rotated by an external control.	
August 9, 1934 435220	BARR and STROUD LTD and J.M.STRANG	A design for light filters where the filters are placed between the objective and prism, immediately below the prism. The filters are in a circular holder controlled by a knob below the prism container.	This approach was used on binoculars supplied to the Admiralty by Barr & Stroud.
December 29, 1934 449552	Thomas Yeomans BAKER and John Frederick SUTTON	A design to facilitate the removal, cleaning and replacement of the prisms without a loss of parallelism. In the specification reference is made to using a prism of one piece of glass or of several components cemented together to form a prism block. In the complete specification the emphasis is on the construction and fitting of the unit holding the prism block. Access is by means of a large circular plate on the side of the body.	Captain BAKER had been in charge of the Admiralty Research Laboratory during the trials for the Naval Night Glasses.
October 20, 1936 483491	Frederick William WATSON BAKER Wilfred Ernest WATSON BAKER and Cecil Douglas REYERSBACH	A design for mouldings of a plastic material which have recesses to contain either prisms or mirrors. The two mouldings are then joined to form a sealed unit which can be inserted into a	Of W.Watson and Sons Ltd.

		binocular or telescope body.	

February 25, 1939 530506	BARR and STROUD LTD and J.W.FRENCH	A design for an eyepiece using an aspherical lens element.	
March 22, 1939 526605	BARR and STROUD LTD J.M.STRANG and Claud FOSTER	The design of a rubber eyecup which can be folded down. Allowing use with or without goggles.	
May 31, 1939 529416	BARR and STROUD LTD and J.W.FRENCH	A range finding device that could be attached to a binocular.	
May 31, 1939 529417	BARR and STROUD LTD and J.W.FRENCH	Another range finding device for attaching to a binocular.	
October 26, 1939 572506	BARR and STROUD LTD and J.W.FRENCH	A long patent of 26 pages including the drawings. Various methods of increasing the field of view.	The complete specification was not accepted until 11 October 1945.
March 9, 1940 572537	BARR and STROUD LTD and J.W.FRENCH	A new method of cementing optical components together using a thin sheet of transparent cellulose acetate together with a special solvent. The glass elements and acetate are heated in the solvent and put together. The unit then has further heat treatment for several hours.	

May 18, 1940 541249	BARR and STROUD LTD and J.W.FRENCH	To provide optical instruments with a covering of shock absorbent material, normally the sheathing to be of rubber.	
June 6, 1940 572544	BARR and STROUD LTD and J.W.FRENCH	Methods of improved sealing of eyepieces	
August 15, 1941 580727	BARR and STROUD LTD and J.W.FRENCH	Making prisms from optical plastic allows for the simpler manufacture of complex forms without the need for polishing.	Complete specification not accepted until 18 September 1946
August 21, 1941 551479	John Willam HASSELKUS and Joseph HAMAK	The prism unit of a binocular is secured to a circular plate by means of a molten material which solidifies.	Of ROSS Ltd.
October 8, 1943 568590	John William HASSELKUS and William Thomas RICKETS	A means of securing a lens using a metal with a low melting point, such as Woods Metal. This can also have the benefit of making an airtight seal.	Of ROSS Ltd.
December 27, 1943 579993	BARR and STROUD LTD and Sir J.W.FRENCH	A method of improving the water tightness of prismatic telescopes or binoculars. The eyepiece and objective lenses are fixed in position. Focussing is by means of an extra internal lens which can be adjusted through a water tight connection.	

February 12, 1944 581578	BARR and STROUD LTD and Sir J.W.FRENCH	A method of collimating the optical axes by adjusting the bodies in relation to the hinge. The adjustment being secured by using a gap filling material such as Woods metal or a plastic.	
July 12, 1944 584390	A.KERSHAW & SONS LTD Norman KERSHAW and Harry RYDER	A focussing mechanism which is well protected from the elements. Arms project from the spindle into the bodies to connect with a focussing lens.	
December 18, 1944 586906	TAYLOR, TAYLOR & HOBSON LTD Arthur WARMISHAM and Thomas William CLIFFORD	A design for an optical system usable in telescopes and binoculars with the object of making the instruments lighter in weight. Prisms are replaced by mirrors.	
April 14, 1944 586923	BARR and STROUD LTD and Sir J.W.FRENCH	A design for telescope observation instruments including binoculars where the field of view is rectangular rather than round.	
May 22, 1945 605564	BARR and STROUD LTD and Sir J.W.FRENCH	A binocular eyepiece design for use in an instrument with one objective. One eyepiece is fixed, the other free to pivot about its axis to fit different eye widths.	
November 27, 1946 619205	A.KERSHAW & SONS LTD N. KERSHAW and H. RYDER	A design for a small Galilean binocular. The objectives have a rectangular form. There is no hinge.	Sold by Kershaw as the ELITE

August 6, 1947 640506	BARR and STROUD LTD and Sir J.W.FRENCH	Designs for binoculars both Galilean and prismatic where one side of the binocular is smaller than the other. This still allows for a satisfactory stereoscopic view.	
January 10, 1949 657095	A.KERSHAW & SONS LTD N.KERSHAW and H.RYDER	Improved sealing between the arms of the focussing mechanism and the eyepieces.	
July 1, 1949 702034	BARR and STROUD LTD	A design for a submarine periscope with a binocular eyepiece.	
November 23, 1950 687383	ROSS LTD	A pad to be used by spectacle wearers on binoculars with long eye relief. The pad screws on to the top of the focussing spindle and rests against the forehead. This keeps the eyepiece at the correct distance.	Ross made three models equipped with the pads. the 8 X 40 SPECTAROSS, the 8 X 35 SPECTACLE SOLAROSS and the 9 X 50 SPECNORM
November 8, 1951 708362	ROSS LTD and Owen George HAY	A new optical cement	This was sold by Ross
1112157	AVIMO LTD	A design for a hinge that enables manufacturing costs to be reduced. It also provided a means of collimation.	

