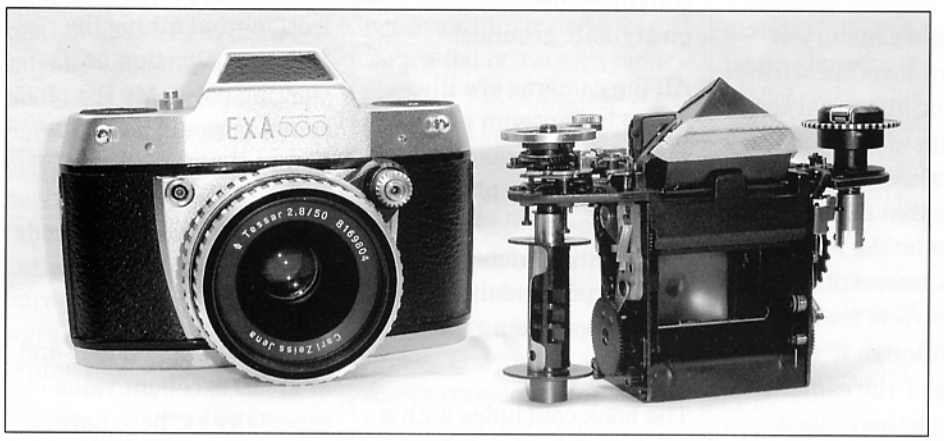
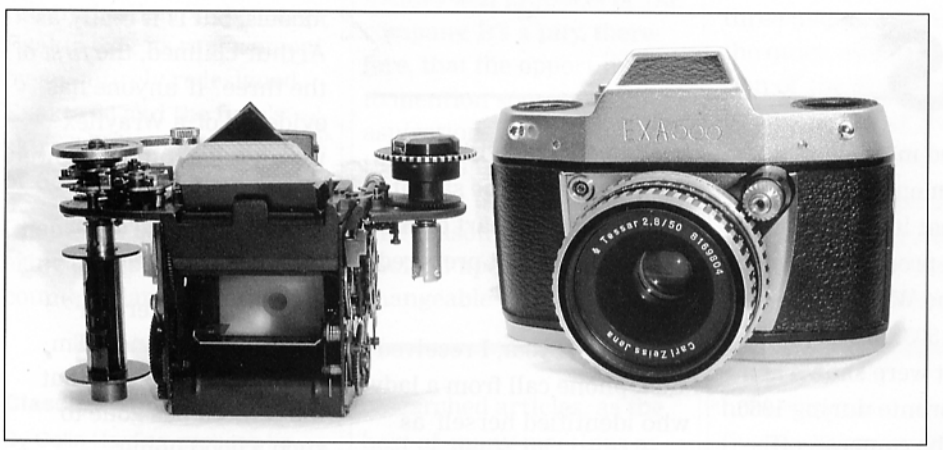
The Ihagee Exa 500

By G P Lowery



What a marvellous choice for the aspiring amateur camera mechanic! Do not fall into the common trap of underestimating this little focal plane eye level single lens reflex from East Germany. Ihagee made interesting and cleverly designed cameras for about one hundred years.



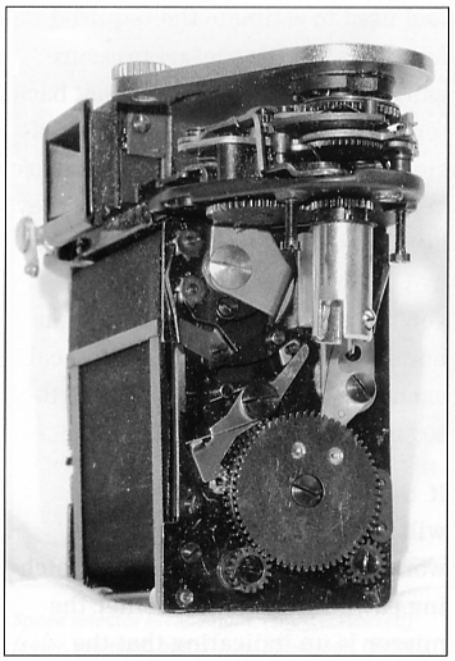
Top: Body, works, three-quarters front right. Above: Body, works, three-quarters front left.

I FOUND NUMBER 307194 in the boot sale area of the local Saturday market. Although it looked tidy the lever wind did not feel quite right and the shutter was certainly not producing the indicated exposure. The asking price of £9 would not break the bank but there was all the rest of the market to explore. Some time later, with nothing older or more interesting discovered, I returned and asked the stallholder to demonstrate the shutter himself. This is a much more convincing ploy than trying to persuade the owner that you have discovered a problem. After pointing out its shortcomings and the most brief negotiation the camera "as found" was mine for only £5, and that is with a 2.8 Tessar! It was bought solely as a subject for investigation and at that price could be written off against experience - cheaper than a visit to the cinema! It should not need to be explained to serious collectors that this attitude is only acceptable when the item is commonly available. On my return home I discovered that I already had a near perfect example anyway.

Since no amount of exercise improved the performance I began to check the construction with a view to servicing the mechanism. Rewind spindles do not vary much, but this one is surrounded by the shutter speed selector dial. The lever wind would have to come off but there are no obvious screws. The top plate has four raised head screws, two in the front, two in the back. The rewind spindle was removed first, and the components reassembled so as to avoid losing anything.

This revealed that the speed selector dial was retained by a simple wire circlip, so it was set to "B" (the most easily remembered position) and lifted out. Its motion is transferred to a pinion visible on the top frame and is unusual in that it has no stop, it rotates without limit in either direction. In this case setting it to "B" was not really necessary as the position can be easily identified prior to final assembly. The release lock does not have a screw - it simply pulls out.

Removal of the lever wind was initially something of a puzzle but the black ring is easily prised out and eventually the knurled knob securing the exposure counter was unscrewed after locking its dial - a few pieces of masking tape should suffice. The wind lever was next, but



Shutter winding gears, relaxed.

was replaced after the body top plate was out of the way so as to enable normal operation.

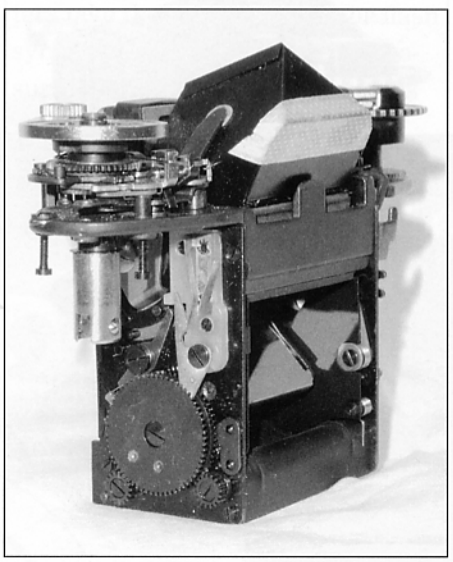
At this stage you can still not see much mechanism, so the question has to be asked - where is it all then? This is where it gets very interesting and you have to admire the simplicity of the design. Within each film chamber there are two cheese head screws, and when they are removed the entire mechanism top plate including the mirror box is released from the body casing. The speed selector and escapement are mounted on the left hand outer face of the mirror box.

Remember the traditional position of the Exakta shutter release? The vertical run fabric blinds of the focal plane shutter with their seventeen tooth gears can be easily examined, along with the two sixty three tooth winding gears and the mirror control mechanism mounted on the right hand side of the mirror box. The sprung rollers are at the top, with adjustment by ratchet. Everything can be seen to operate whilst you hold the assembly in your hands.

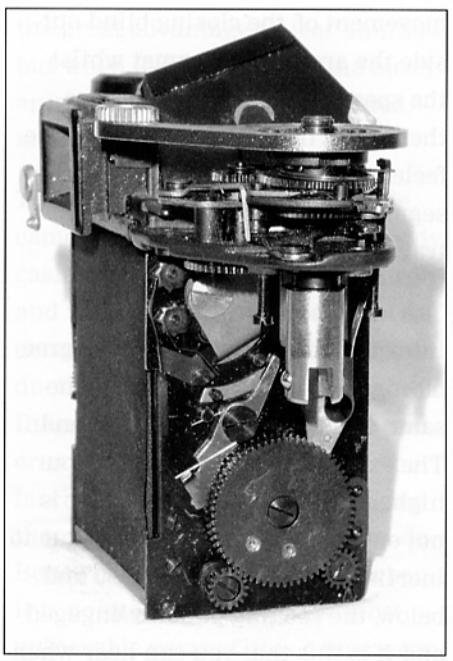
If it is possible to operate the camera at all you can trace the sequence from the lever wind which moves only about one hundred and twenty degrees. After a little free movement, a pin projecting from the underside of the lowest component of the winder assembly contacts the end of a lever pivoted adjacent to the front of the mirror box. When this lever reaches its forward limit it operates the frame counter pawl. A short link connects the front lever to a similar one pivoted near the right extremity of the body in a layout like a "H" lying on it's side. (The fulcrums are NW and SE, the input NE and output SW).

This results in the free end of the second lever moving forward as the winding stroke progresses. A feeler tests the position of the second lever and locks the winder if it is already forward. A toothed segment, operated by a projection through the top plate winds the shutter gear train situated behind a baffle inside the mirror box.

This component also carries the red warning signal which appears in the upper left corner of the screen when the shutter is not cocked. When it is cocked, the arm which carries the red signal is the trigger for the opening blind, tripped by the rising mirror. It operates by releasing a pawl



Shutter winding gears, cocked, showing sync. contact.



Shutter winding gears, cocked, note pawl and pin upper left wrt gears.

holding the large gear associated with the lower front roller, the opening blind. The shutter release button actually trips a mechanism which raises the mirror. This is what is referred to as a four axis shutter - each blind has its own sprung roller (just like a small version of a window blind).

It also has a gear driven roller to draw the blind off the sprung roller. On completion of the exposure the blinds overlap slightly and since they are both drawn off the sprung rollers at the same rate there is no slit - the shutter is self capping. The term derives from the days when the lens cap had to be fitted during shutter cocking, many early shutters had fixed slits. The variation in exposure is obtained by delaying the release of the closing blind. Since both blinds are held by the pawl holding the opening blind, when released, both blinds are free to move.

The opening blind responds immediately but the closing blind is working against the delay of the speed selector escapement through the seventeen to fifty eight tooth gearing on the left hand side. There is a little

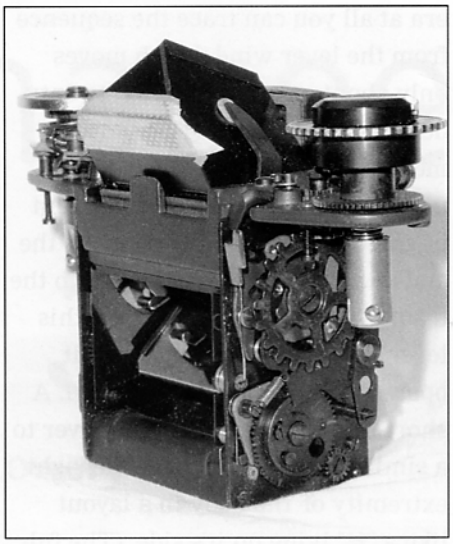
movement of the closing blind outside the area of the format whilst the speed selector train operates, then when the delay is complete the feeler skates around the adjustable segment without further radial travel.

You may be understandably intrigued to observe that the degree of engagement of the feeler is the same on 1/60 as it is on 1/2 second. The explanation is that on the four higher speeds the rocking pallet is not engaged - the only delay is due to inertia in the system. On 1/30 and below, the rocking pallet is engaged and it is this that you can hear when you change the setting when the shutter is cocked. The tension of the two sprung rollers should be comparable and can be set up using ratchet wheels at the right hand end of each upper roller.

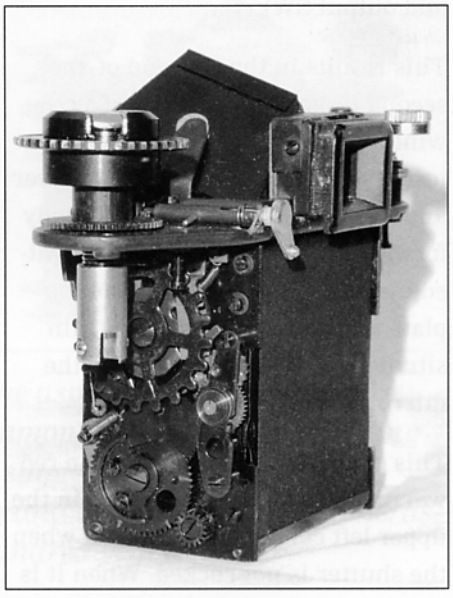
Purists sometimes argue that the effective slit width of focal plane shutters varies due to one blind being closer to the lens than the other - in this case the opening blind is rearmost. As viewed from a point at the centre of the lens a narrow slit will be wider at the bottom of the format than at the top, and this can be compensated by slightly lower tension, and hence slower travel, on the closing blind, allowing the slit to widen, but at most settings the difference is of no importance.

Given the above, I was puzzled to find that the force applied at its periphery which was required to move the sixty three tooth winding gear for the opening blind with the shutter relaxed was 80g, compared to 180g for the closing blind. When cocked these figures rose to 200g and a little more than 500g!

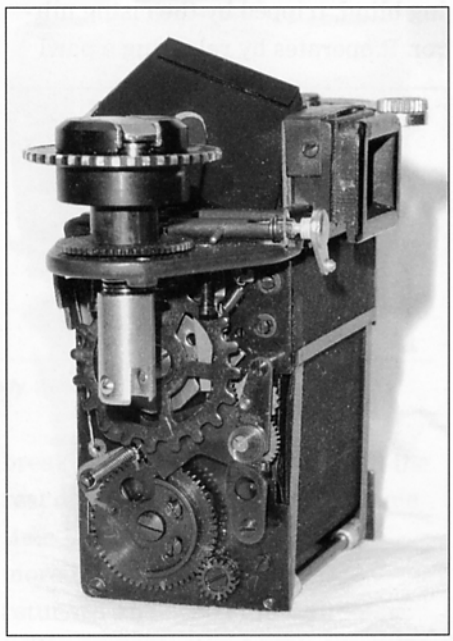
The gears were held in a position where they were free to move whilst the measurements were made. The tool used to estimate the required force was a relay contact pressure gauge which works like a break back torque wrench. They may still occasionally be seen at boot sales and are very rarely recognised for what they are. Most appear to have been made by GEC but you should make sure you get the operating arm which is housed in a clip on the side Typical examples would have a range of 10-80g and 100- 500g.



Shutter speed selector wheel with cam behind.



Speed selector escapement, (shutter cocked) feeler, segment, and closing blind gear.

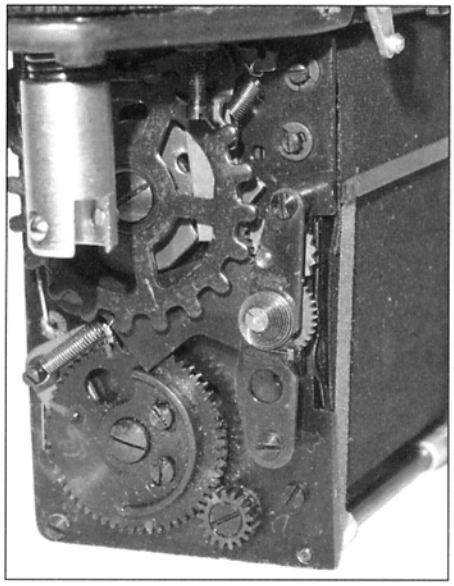


Speed selector escapement, (shutter relaxed) feeler, segment, and closing blind gear.

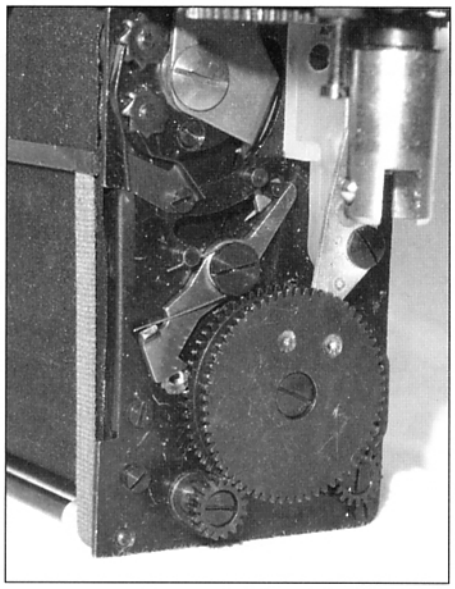
If the mechanism is jammed you will have to trace the problem by working back from the shutter latching pawl. First check whether the mirror is up indicating that the release has already been pushed. You can tell if the shutter has fired by the position of the two bright riveted heads on the outer gear. When cocked, the more clockwise one just passes a line between the centres of the large and rearmost small gear. Moving the plated sprung lever immediately above a little clockwise should release the opening blind. (This action is normally performed by the rising mirror).

The large gear only rotates half a turn anticlockwise. With the format fully uncovered a pin on the large inner gear operates the flash synchronising contact. If only one blind runs, you most likely have a problem with the slow speed escapement on the other side. The large fifty eight tooth gear with the adjustable sector screwed to it should be moving, driven by the closing blind sprung roller. If it is not, the gears of the speed setting escapement mechanism may be sticky.

Probe the freedom of movement of the feeler which runs on the adjustable sector. Try it on "B" if you can remember where that is. (The larger flat section of the cam will be at about 30 degrees to the right of vertical and the feeler will be just clear of the adjustable sector).



Speed selector escapement, (shutter relaxed) feeler, segment, and closing blind gear. (detail)



Shutter winding gears, latching pawl disengaged, shutter relaxed.

Do not worry that the mirror stays down, you have by-passed that part of the sequence. If the shutter is cocked and you change the speed setting you should hear the gears as the cam follower changes the delay before the closing blind is tripped. The normal position of the mirror is down, so if you find it up the shutter has failed to complete its sequence.

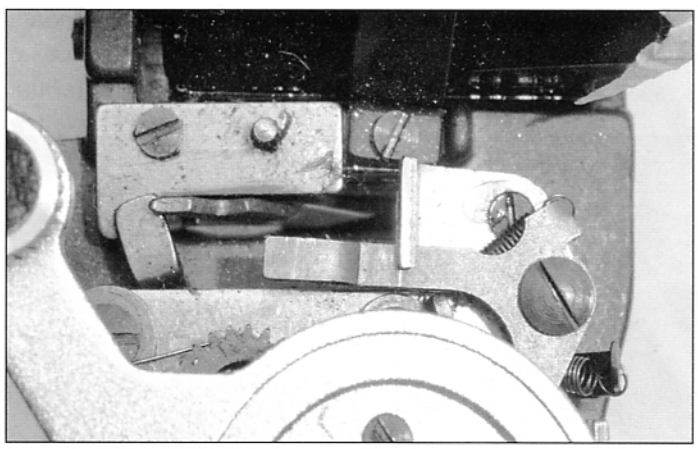
If you are working backwards and can deduce the required trigger action for the next operation, you can often feel the freedom of movement of the mechanism by gently probing, for example with a wooden cocktail stick. Be prepared for everything to suddenly burst into life if you disturb whatever was jamming it though.

Try to avoid using anything magnetic, or even metallic as a probe. Remember also that just because you got it to work once, you have not yet found the problem, at best you have proved that all the components are probably still there. I found a few pieces of broken film from the sprocket holes but the main problem was lack of lubrication.

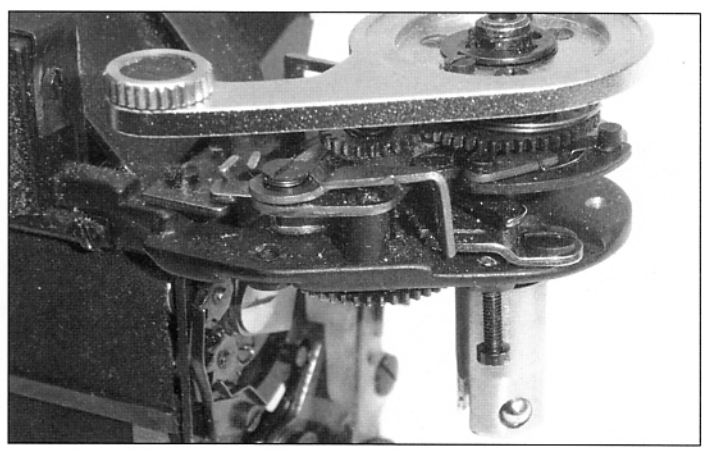
If you have never been inside a camera before, bear in mind that reference to shutter speed is not strictly correct - the blinds always run at the same speed. What is controlled is duration of opening. Even that can be confusing - all focal plane shutters take the time specified for flash synchronisation to complete exposures nominally shorter. That was the great advantage of leaf shutters, but when used on a reflex the mechanism becomes very complicated, and hence less reliable.

The optically critical parts of the camera are thus all part of the body casing, whilst the exposure control and film wind are mounted on a self contained sub-chassis. In the introduction to this article I asserted that Ihagee made cleverly designed cameras and many years ago I became fascinated by the Lateral Thinking theories propounded by Edward de Bono. The two come together when it is pointed out that all the most vulnerable parts of this camera can be accessed in less than two minutes by removing only eight screws. If you remove the four securing the chrome top plate then the four in the top of the film chambers all the mechanism simply lifts out. When the time comes to put it all back together, remember to put the shutter release button back in place first - it is bound to have fallen out, and the film transport sprocket will be out of position too!

I was sufficiently impressed with this clever design to start looking out for a scrap Exa 1 to examine more closely, as I believe the shutter used in that may have been inspired by the same principle as the mirror and blind shutter of my Talbot and Eamer Miral, dating from about sixty years earlier.



Horizontal to vertical transition of shutter winding levers, from above.



Horizontal to vertical transition of shutter winding levers, from back, note position feeler (Centre of frame)