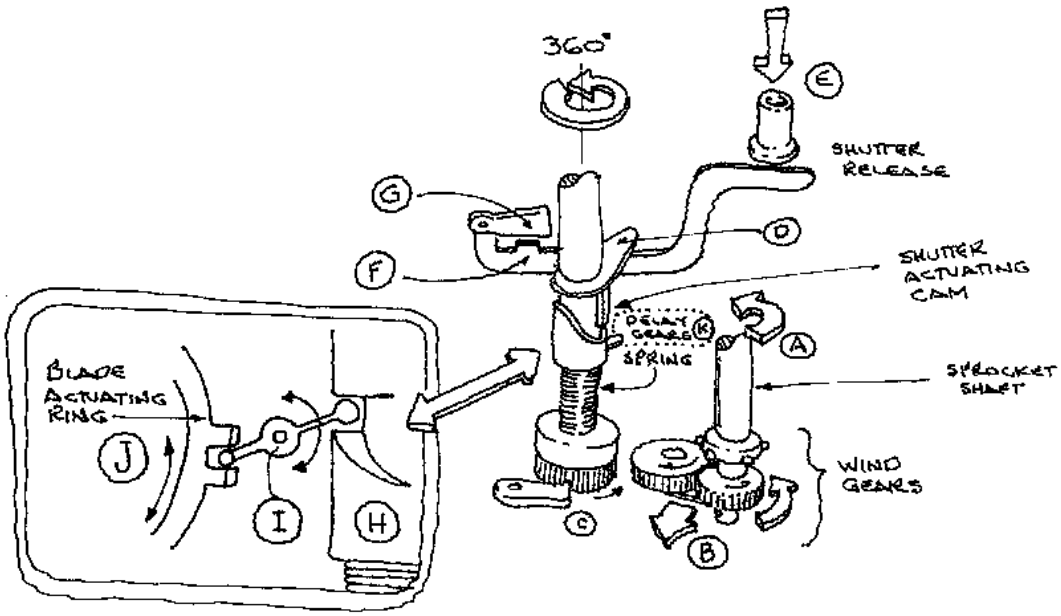
HOW IT WORKS: Argus C4

The shutter mechanism used in the Argus Model 21 Markfinder, C-4 and C-44 cameras is an interesting and unique design. It is, for instance, the only leaf shutter I can think of in which the blades are positively driven both open and closed, rather than having a simple spring-return to close them (for car buffs, this arrangement is reminiscent of the Desmodromic valve train used in Ducati motorcycle engines). The only thing it shares in common with Argus' earlier C-3 shutter is its basic behind-lens leaf format; and it shares even less with other leaf shutter designs. Let's take a look at it:



Wind and Release Cycle of the C-4 Shutter

The wind knob is geared directly to the sprocket shaft, so that winding causes the shaft to rotate counter-clockwise (A). There is a gear at the bottom of the shaft which is constantly in mesh with a second gear on a free-swinging arm (B); as the sprocket shaft rotates, this second gear swings into mesh with a gear (C) at the bottom of the shutter spring and winds this gear one turn counter-clockwise, tensioning the spring. The upper end of the spring is attached to the actuating cam, which is prevented from rotating by its arm (D) which is stopped against the release pawl at (F) (I've shown the arm rotated clockwise a bit so

you can see it). In this parked position, the end-of-travel stop (G) is resting on top of the arm (D).

To release the shutter, the release button (E) is pressed down, rotating the arm below it downward (clockwise about its axis at the left end). This causes the release pawl (F) to move downward, releasing the arm (D) and allowing the actuating cam to begin rotating counterclockwise. At the sme time, end-of-travel stop (G) also moves downward, under spring force, as soon as the arm is out of its way.

As the actuating cam rotates, a ramp (H) on its side causes a small link (I) to rotate. The opposite end of this link is connected to a slot in the edge of the blade actuating ring (J), causing the blades to open. At about this point, a pin at the lower end of the actuating cam strikes the lever of the delay escapement (K), causing it to hesitate for 1/10 to 1/300 of a second, depending on the speed selected. After continuing past the delay escapement, the cam continues to rotate. Another ramp on the cam engages the link, driving it back in the opposite direction and forcing the shutter blades closed.

The cam continues to rotate until arm (D) comes to rest against end-of-travel stop (G), stopping the rotation of the cam. The shutter release remains in the depressed position until shutter is wound again. As it rises, both the release pawl (F) and the end-of-travel stop (G) rise accordingly. Thus, during the winding process, the arm (D) slips from the stop (G) to the pawl (F) and the shutter is ready to operate again.

The weakest point in the C-4 shutter is the little link at (I). It is very small, and the positive action of the two-way actuating cam has the capacity to apply a great deal of force to it if the shutter should become jammed. Unlike other leaf shutters, sticky blades in the C-4 can become a life-ending event if left untreated.