Courtesy of Derek Roberts Antiques

MATHIAS HIPP, REUTLINGEN. AN EXCEPTIONALLY IMPORTANT, RARE AND INTRIGUING EXPERIMENTAL PRECISION REGULATOR BY THE DESIGNER OF THE 'HIPP TOGGLE' USED IN EARLY ELECTRIC CLOCKS. CIRCA 1840.

An extremely unusual and intriguing wall mounted regulator. The case consisting of a substantial wooden backboard which is mounted to the wall and from this is hung the walnut case, which itself has an opening door. The case is surmounted by a carved cresting and is of six light construction.

The massive brass bob pendulum is suspended from an iron bracket mounted on the backboard and consists of a gilded wood rod with a brass and steel yoke on which the pendulum bob is hung.

The movement is in two parts. The main weight driven part of the movement is mounted on the backboard behind the pendulum and just above the pendulum bob. It has a large great wheel driving through a small gear train and to a chronometer escapement, utilising an experimental version of Hipp's 'Toggle'. This impulses the pendulum as the arc of swing diminishes. The dial for this part of the movement advances two minutes each time the pendulum is impulsed and is, therefore, a counter for the number of impulses given. This would show the consistency of the impulsing during a given period.

The main dial of the clock with centre sweep seconds, minutes and hours is mounted three quarters of the way up the pendulum. It is signed for the maker Mathias Hipp, Reutlingen. This has no visible power supply and in fact the pallets for the pin- wheel escapement do not rely on any power coming from the gear train, but are designed to push the pins, thus impulsing the clock movement without the need for power. This main dial has a beautifully engine turned bezel which, although fully enclosed within the case, also has an opening glazed door. The weight drive to the bottom movement goes up to the top of the case and then, via a pulley, the small weight descends on the right hand side of the case. The pendulum oscillates against an adjustable beat scale mounted at the bottom of the

backboard.

This method of driving a clock via an occasionally impulsed pendulum but with the movement having no power itself is of course a forerunner of the early electric clocks which used Hipp's Toggle. Here again the motive power and impulse comes entirely from the pendulum and the inertia in the swing of the pendulum then powers the clock itself. When you examine the movement of this mechanical clock and then compare it with the various mechanical innovations that Hipp used on his electric clocks you can see an instant relationship. This clock was almost certainly used as a test bed for this escapement. The date of this clock would tie in with it being used as an experimental clock prior to Hipp moving to electric clocks. Also it is likely that early in the experimental stage the movement was free mounted rather than cased probably on the existing backboard. This would explain the glazed bezel over the main dial. Also the counter dial points to this being an experimental clock. The clock has a long duration which varies dependent on the weight used.

Length: 5' 2" (158cms)

Dr. Mathias Hipp. (1813 - 1893)

Dr. Mathias Hipp was a brilliant theoretician born in Wertenberg in Germany. He became famous for mechanical horological improvements and when he was only 21 in 1834, he devised the Hipp toggle as part of an escapement for clocks which was later used on many electric clocks. It was also called Hipp's butterfly switch and was used to maintain a pendulum's oscillation electrically. In 1842 he established himself in Reutlingen where he principally worked on constructing a clock after his own design. Hipp's own clock appeared in 1843 with a movement at the base of the pendulum, achieving a precision of + or - .025 seconds. This clock would appear also to be experimental. The use of the powered control dial at the bottom of the pendulum, coupled with the main clock dial powered entirely by the pendulum's oscillation is extremely unusual.

Further reading: Meister der Urmacherkunst by Jurgen Abeler 1977 S281 and Swiss Timepiece Makers by Kathleen H. Pritchard 1997, pages 36 - 39. Derek Roberts Precision Pendulum Clocks - Volume I pages 141 - 143.