Synchronome Electrical Co. of Australasia Ltd

Electrical Engineers, Manufacturers and Electro-Platers
Specialists in Electric and Tower Clocks

SYNCHRONOME BRISBANE 1903 - 1991

The story of the Jackson family of electrical clock makers

AN HISTORICAL PROJECT BY:

NATIONAL ASSOCIATION OF WATCH & CLOCK COLLECTORS QUEENSLAND CHAPTER 104

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NATIONAL ASSOCIATION OF WATCH & CLOCK COLLECTORS QUEENSLAND CHAPTER 104

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Front Cover: A Synchronome dial circa 1910
Back Cover: Clock House, 195 Elizabeth Street, Brisbane Synchronome headquarters 1927 - 1953

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Synchronome ELECTRICAL CO. OF AUSTRALASIA LTD.

ELECTRICAL ENGINEERS, MANUFACTURERS AND ELECTRO-PLATERS
SPECIALISTS IN ELECTRIC AND TOWER CLOCKS

ALF. GEO. JACKSON, A.M.I.E.E. — MANAGING DIRECTOR
ARTHUR A. JACKSON, A.M.I.E. AUS — WORKS MANAGER

CLOCK HOUSE,
195 ELIZABETH STREET.
BRISBANE.

INTRODUCTION

This book celebrates the work of three generations of the Jackson family in electrical engineering and horology in Queensland. The authors are members of the First Queensland Chapter (104) of the National Association of Watch and Clock Collectors (NAWCC).

Alfred George Jackson initiated what was to become the Synchronome Electrical Company of Australasia in 1897. It dealt in a range of electrical engineering matters and electroplating, but as the name implies, a major part of the business involved the Synchronome electrical clock system which had been developed in England by Frank Hope-Jones. Full rights to the system were purchased so that independent production of clock systems could be carried out in Brisbane.

A very early highlight of the company's activities was the installation of a mechanically driven, but electrically controlled, tower clock in the South Brisbane Town Hall in 1904. In 1929, an electrically controlled and driven clock with electrically driven striking was designed and installed in the new Brisbane City Hall by Alfred's son Arthur. Both clocks are still operating today.

In 1935, upon the death of A.G. Jackson, the management of the firm passed to Arthur Jackson and in 1979 to two of his sons, William and John. In 1953 William formed the company 'Australian Clocks' which took over manufacturing activities. In 1973 all operations were brought together in the Brisbane suburb of West End, only to be devastated by the major 1974 flood. In 1991, with no family members to carry on the business, Bill and John (Jock) sold the company, now known as Synchronome Pty. Ltd.

The NAWCC project to record the Synchronome history so far has involved interviews with Bill and Jock Jackson. These tapes are with the John Oxley Library in Brisbane. Most photographs in this book, many taken by the Jacksons, have not been published. They give a glimpse of a memorable firm which was a leader in technology early in this century and which provided the correct time for much of Queensland for many decades.

The authors would like to thank Bill, Jock and Joyce Jackson, Bernard Fellner, Greg Baker and the Queensland State Library for assistance in the project, and the members of NAWCC Chapter 104 and the Queensland Department of Heritage for their support. We are also grateful to Arthur Mitchell, Robert Miles and Paul Joyce of the Synchronome Syndicate in England for valuable feedback and to Don Marshall for assistance with editing.

THE JACKSON FAMILY AND BUSINESS

Alfred George Jackson
Born - 3 October 1863 in Manchester, England;
Died - 25 August 1935 in Brisbane, Queensland.

Alfred George Jackson attended Manchester Grammar School and then the University of Manchester, where he was awarded a Diploma in Electrical Engineering. He began work as an apprentice to Levensteins Ltd., a manufacturing dye chemist in Manchester. While there he took a course at London University, winning a medal for dye research.

1879
Took a strong interest in the construction of the first electric motor in Manchester.

1886
Arrived in Sydney, NSW, and started an industrial chemical business.

1887
Sent by a Sydney firm to install electric lighting in Charters Towers, Queensland.

1892
Joined the Queensland electric and power generation firm, Barton and White.

1896
Formed the electrical fittings company of Jackson and Harriss' (in George Street, Brisbane), buying out Harriss share about eighteen months later.

1903
Purchased rights to SYNCHRONOME name and patents from Frank Hope-Jones of London. Alexander Knox appears to have been the intermediary.

1904
Firm moved to Ann Street, Brisbane, under the name 'Synchronome Electrical Company of Australasia'. Also installed the first Synchronome electric tower clock in Queensland, in the South Brisbane Town Hall.

1927
The firm moved to 'Clock House', 195 Elizabeth Street, Brisbane.

1929
Alfred and his son Arthur designed and built the Brisbane City Hall tower clock.

1935
Died aged 72 years. Alfred Jackson was a pioneer of accurate time keeping in Australia and New Zealand. He had a keen interest in lacrosse, lawn bowls, x-rays, magic and fireworks and was active in Freemasonry. He married Elizabeth Hart in Parramatta, N.S.W. in 1890. They had two children, William and Arthur.

Arthur Appleton Jackson
Born - 13 October 1891 Brisbane, Queensland;
Died - 15 January 1985 in Brisbane, Queensland.

1916
Obtained a Diploma of Mechanical and Electrical Engineering at the University of Queensland with further education at the University of Manchester. Worked at Verity Electrical Motor Works, England. On return to Australia was employed by the Brisbane Tramway Trust, Norman Bell (Electrical Engineers) and Thomas Borthwick's Meat Works.

1920
Arthur joined Synchronome to take over while his father went to France (Armentieres) to locate his older son William's grave. Until he joined the Australian Imperial Forces, William had also been with the firm.

1929
Arthur and his father were very proud of the Brisbane City Hall tower clock and Brisbane was proud of its City Hall which was opened in 1930.

1935
Upon his father's death, Arthur became Managing Director.

1937
In connection with the installation of the St. George and Dragon and Knights' Tournament clocks in 'London Court', Perth, by the Brisbane firm, Frank Hope-Jones visited Australia and inspected this and other work of the company.
Arthur was admitted to membership of the British Horological Institute.

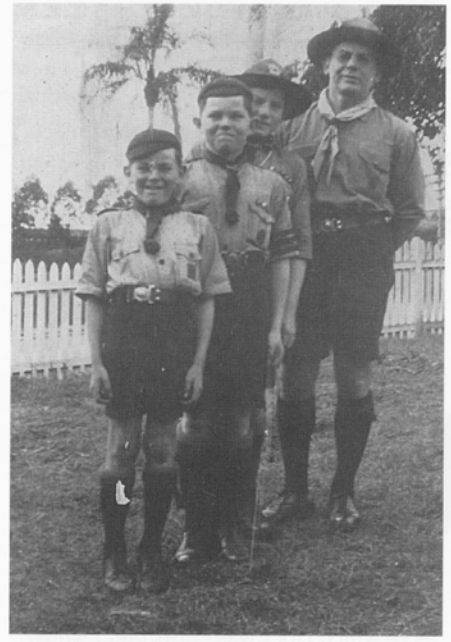
1953
Wishing to concentrate on clocks and timepieces, he sold the wholesale electrical section to H. Rowe & Co.
He carried on the clock business, known for some time as 'Jackson's Clock House' but in reality still Synchronome. To avoid high rents the office was shifted to Charlotte Street and the Repair Department to Melbourne Street (near Grey Street). A new associated company, 'Australian Clocks', was established in Leichhardt Street, Spring Hill, where his son William was in charge of manufacturing and design.

1973
Due mainly to high rents in Spring Hill, the manufacturing section moved to 288 Montague Road, West End, which proved large enough to service all of the company's needs including repairs and retail clock sales.

1974
The severe flood of January put the premises 3m under water.

1979
Sons William and "Jock" and an outside accountant (James Killen) managed the business after Arthur suffered a severe stroke.

Apart from clocks and electricity, Arthur's interests included lacrosse, the Wireless Institute of Australia (particularly in the early years of amateur radio); Scouting in Australia (Queensland Commissioner 1945 to 1960 and founder of "The Gang



A.A.Jackson with sons (R to L) William, John, and Donald in Scout uniforms (1933).

Show" in Brisbane). Awarded C.B.E in 1959 for services to Scouting and the community. In 1980 became a Paul Harris Fellow of Rotary. Active in Freemasonry over many years.

Arthur married Catherine Moffatt of Sherwood, Brisbane, in 1915. They had six children, including William Alfred and John Arthur who carried on the business.

William Alfred Jackson
Born 22 April 1917 in Brisbane, Queensland;
John Arthur Jackson
Born 18 April 1921 in Brisbane, Queensland;

1935
On 20 August William Alfred (Bill) started an apprenticeship of five years and was indentured with the firm as an electrical fitter and mechanic. Had previously attended technical college.

1936
Arthur's second son, John Arthur ("Jock") started as a message boy in the firm.

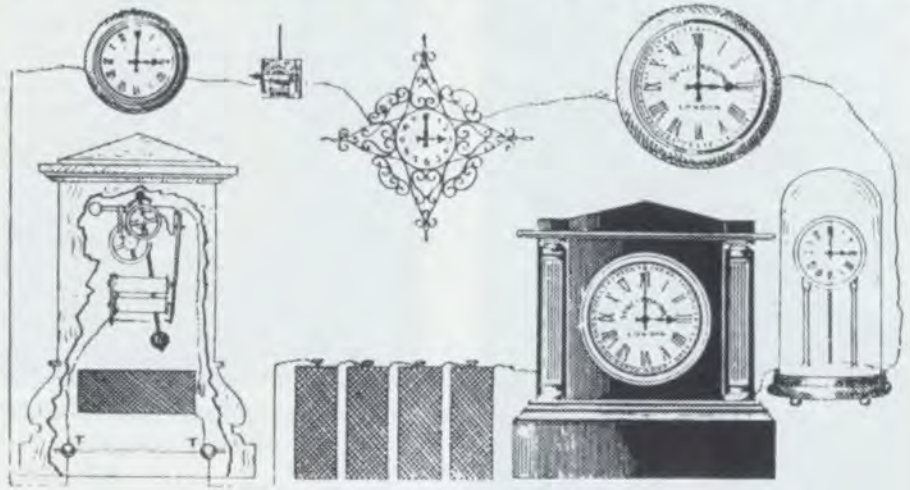
1942
Bill volunteered for war service from Bundaberg and at war's end did electrical work for 3 years, mainly at St. George, Queensland. Although Jock volunteered he was kept in a 'reserved occupation' in the firm, doing much work for the United States Forces.

1948
Bill rejoined the family firm, specialising in the design and installation of large electrical clocks.

1979
After his father's stroke, Bill made many public clocks. Jock dealt with retail and repairs.

1991
The flood's aftermath of debt was cleared and both Bill and Jock were ready to retire and Synchronome was sold to Tony Klee.

THE SYNCHRONOME ELECTRIC CLOCK SYSTEM



An illustration of the Synchronome Electric Clock System, circa 1903.

Until the introduction of accurate public clocks based on Huyghen's pendulum principle in 1656, time for the average person was measured simply by reference to sunrise and sunset, with hours being rough divisions of the period between. The development of the pendulum and the replacement of the verge escapement with the far superior anchor or recoil escapement improved the accuracy of clocks from at best about five minutes per day to about one second per day.

Initially, the most common form of public time was the tower clock, often with bells sounding the hours. These were expensive precision mechanisms and as such were usually placed in prominent positions to allow a clear view of the dials. If not in view, the clocks had chimes that could be heard from afar. These public clocks, many of which survive at least as landmarks if not as working clocks, suffered the disadvantage that, lacking access to continuous 'standard time', any error in the time keeping of one clock could go undetected, and could cause confusion as to which clock was correct and which was in error.

During the Industrial Revolution, with the widespread use of rostered labour in factories and the railways and many other business and public activities requiring close regulation, time became an important public commodity. Thus there came about a need for inexpensive, mass-produced timepieces or dials which could be readily synchronised, even at a distance.

Even after the introduction of the pendulum and the anchor escapement, clock makers and scientists continued to pursue perfection. Accuracy was limited by sources of error due principally to the way in which the spring or weight power which drove the clock was transmitted as impulses to the pendulum, in order to keep it swinging in a precisely even arc, and thus at an even rate.

Many attempts to overcome these problems were made between the early eighteenth and mid-nineteenth centuries. A new era of time-keeping was ushered in by Alexander Bain's 1841 patent for the use of electric cells and an electromagnet to impulse the pendulum, eliminating the need for springs or weights. By 1860 electric clocks were being produced in Neuchatel based on Matthaus Hipp's 'toggle' principle. A small groove was made in a block mounted just below the toggle close to the pendulum. When the pendulum arc falls below a certain value, the toggle catches in the groove and depresses the block. This closes a switch allowing electrical current to pass through an electromagnet, impulsing the pendulum and maintaining the motion. The Hipp design was used as the basis for many electrically-powered clocks in Britain and Europe. In 1888, an American, Chester Pond, patented his Self-Winding Clock and a system for correcting remote slave dials via the telegraph network. Pond's system was used widely in the US by the Western Union Company.

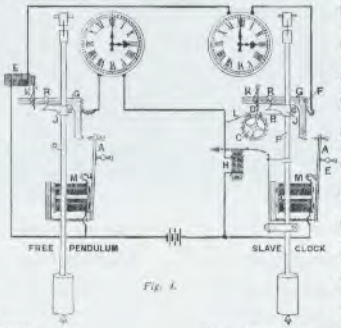


Fig. 1.

One of the last major developments in mechanical clocks was the Synchronome clock system. The first form was patented in London by Frank Hope-Jones (with G.B. Bowell) in 1895. Several subsequent design changes were made over the ensuing thirty years. The most radical was in 1905 when the dead beat escapement was superseded by a remarkably simple gravity escapement.

A feature of the Synchronome system was to achieve the separation of the pendulum impulsing and electrical contact-making functions, contributing significantly to the accuracy of these clocks, to around one second a week. The Synchronome system also included inexpensive yet reliable slave dials, operated by low voltage electrical current pulses from the master clock every 30 seconds. Many slave dials of various sizes could be connected in a simple two-wire circuit, allowing a whole system to be powered from several 1.5 volt dry or wet cells for as long as three or four years, with minimal attention.

The mechanical simplicity of both the master clock and slave dials contributed to the reliability and low cost of the system, encouraging its widespread use in railways, factories, churches and public buildings throughout the world from the early 1900s until rendered obsolete in the 1970s by low cost quartz clocks and watches. Hope-Jones also worked with W.H. Shortt to develop the Shortt Free Pendulum clock. From 1921 this became the most accurate timekeeper in the world, until finally eclipsed by the invention of the quartz-crystal and atomic clocks. The Shortt clock consisted of two pendulums, the master of which was enclosed in an evacuated tank, impulsed by a small gravity arm released each 30 seconds by a modified Synchronome 'slave' pendulum. The slave was in turn regulated by a signal from the master pendulum. In a temperature controlled environment this system achieved an accuracy of better than 0.01 seconds a day, and was reportedly used by the U.S.S.R. during the Sputnik orbiting satellite programme.

SYNCHRONOME IN BRISBANE

Alfred George Jackson arrived in Brisbane about 1891, initially working on the electric lighting at the Brisbane Exhibition Ground and then with the Queensland Milling Company.
In 1892 he joined Barton and White as an electrician, working with them until 1896.


ADELAIDE STREET, Telephone No. 184.
Near GEORGE STREET.
Brisbane, 189
Messrs from JACKSON & HARRISS,
Brisbane Electrical Fittings Works.
IMPORTERS OF ELECTRIC LIGHT FITTINGS and MACHINERY, MEDICAL BATTERIES, BELLS, TELEPHONES, SPEAKING TUBES
REPAIRERS AND FITTERS OF CASH REGISTERS, TYPEWRITERS, MACHINERY, and ELECTRICAL APPLIANCES of all kinds.
ELECTRO AND NICKEL PLATING, LACQUERING AND BRONZING.

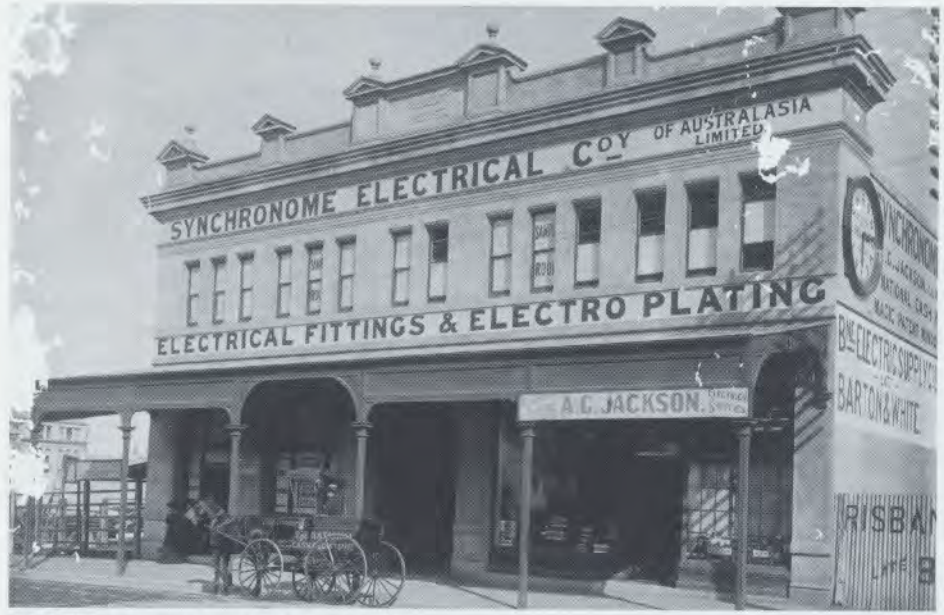
He commenced his own business in 1896 as an electrical engineer and in 1897 he formed a partnership with Mr A.G. Harriss. They were importers of electric light fittings and machinery, medical batteries, bells, telephones and speaking tubes. They also repaired and supplied cash registers, typewriters, machinery and electrical appliances of all kinds. This partnership lasted approximately 18 months until Jackson purchased Harriss's share. Jackson's business was incorporated as a limited company in 1904 under the name of the Synchronome Electrical Company of Australasia.

During 1903 the Australian and New Zealand rights of the Synchronome Company were purchased by what Jackson refers to in his letters to Hope-Jones as "the Syndicate". Five hundred pounds was paid to the Synchronome Company in England, tiding it through a difficult period. Apart from A.G. Jackson, the only other name mentioned as part of the syndicate was a Mr Alexander Knox. Letters in the company files reveal considerable tension between the Syndicate and Hope-Jones, both in the legal settlement and over the supply of goods and access to companies in England and Europe which produced parts of Synchronome movements. Although copies of a number of letters written by Jackson survive, unfortunately no replies to these letters can be found. The letters do reveal an interest in both electrical and mechanical matters as diverse as electric lifts and Patent Cycle Rifle Clips. The latter were adopted by Queensland and New South Wales for the Cycle Corps, and a number were sent to South Africa with the Cycle Contingent during the Boer War.

The Synchronome Electrical Company of Australasia was originally located at 355 George Street in Brisbane and moved to 67 Ann Street in 1904, later expanding to 65-67 Ann Street.

Two clock systems were installed in 1903, at Allan and Stark, a department store in Brisbane, and the Queensland Railway Department. In 1904 agencies were established in Sydney and Melbourne and installations rose to six, including the tower clock in the South Brisbane Town Hall. This is a mechanical, manual wind clock, controlled by a Synchronome master which impulses a solenoid every 30 seconds allowing the mechanical movement to progress in half-minute steps. The clock is still operating in 1998.

Business improved in 1905 with eight installations being recorded, including the first of many to a Mr A.E. Dewar in Auckland, New Zealand, who was responsible for the initial installation in the Wellington Telegraph Office.



65 - 67 Ann Street premises, circa 1904.

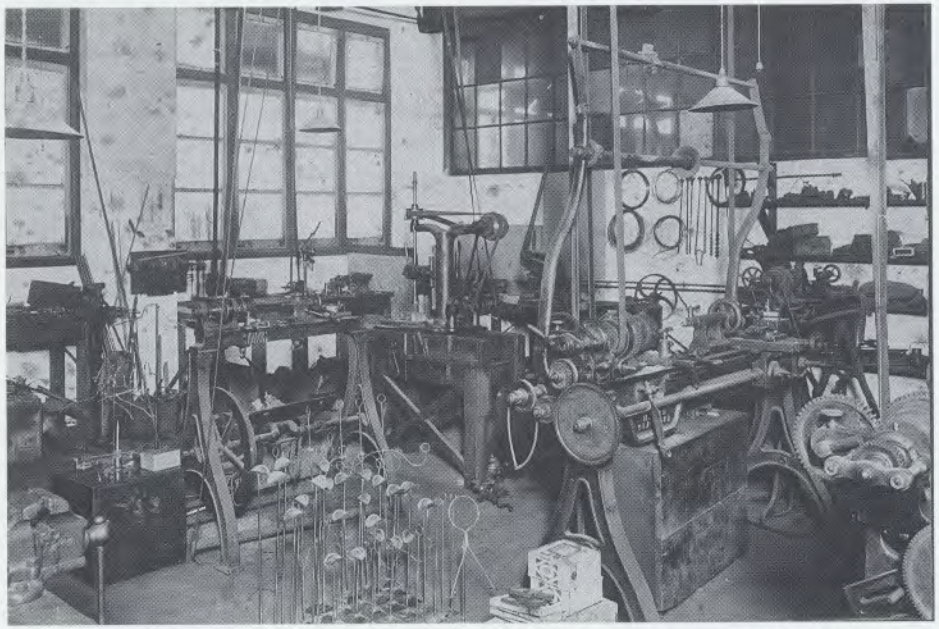
In 1905 and 1906 master and slave clocks were being sent interstate to New South Wales, Victoria and South Australia.
In the following years installations of all types of clocks continued, with the majority of components being imported from England and Europe.

The company records between 1903 and the end of 1957 reflect the enormous influence which Synchronome had on public time keeping. During this period a total of 407 master clocks and 2727 slaves were sold in Australia, New Zealand and New Guinea. Of these, 219 masters and 1786 slaves were sold and installed in Queensland.

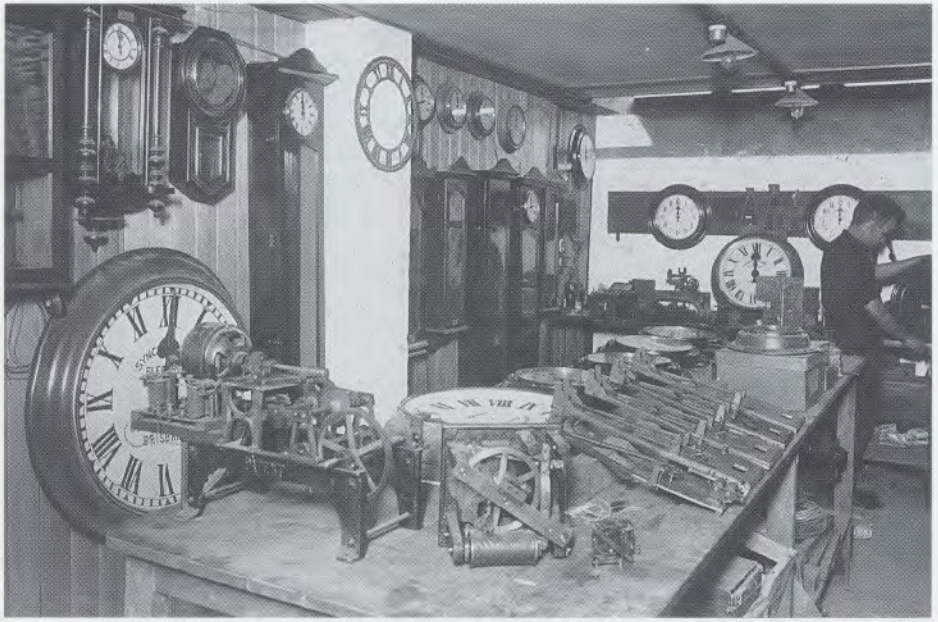
These figures do not include the sale and installation of bell controllers, time recorders, watchman's clocks, calendar clocks, time switches, memorial clocks, turret clocks, carillons, synchronous clocks, DC movement clocks, frequency controllers and comparators (for use in power stations) and mechanical clocks. As well as clock construction, assembly, installation and repair, in the early days the company offered a wide range of products, goods and services including cash registers, telephone bells and switchboards, batteries for phones, clocks and the medical profession, nickel plating, electroplating and bronzing, electric hair curling wands, patented shop window fittings, dynamos, motors, arc lamps, wires and cables, petrol generating lighting sets, school bells and fire alarms.

In 1920 Alfred's son, Arthur joined the firm. In 1927 the first carillon in Queensland and a Synchronome master and slave clock system were installed by the company at St Andrew's Church of England, Lutwyche.

Clock House 195 Elizabeth Street Brisbane, circa 1930.



Clock House, ground floor workshop, circa 1930. The electroplating facilities were behind the windows at the back. A batch of shoe display stands are pictured in the foreground.



Clock House basement, circa 1930. Several partly completed master clocks are on the bench, together with a No.2 and a No.5 movement. At the left is a prototype electric motor movement operating on the same principle as the Brisbane City Hall Clock.

Synchronome's Gold Medal winning display at the Brisbane Exhibition in 1927.

Synchronome Electrical Company of Australasia Staff, June 1947 (taken at Poulsen Studio, Brisbane):
BACK ROW *from the left* - W.J. Innes, S. Cole, E.A. Kermode, J. O'Keefe, W.A. Jackson
THIRD ROW - M.J. McEwen, K.A. Reedman, D.G. Luke, W.J. Percival, R.F. Bielefeld, A.H. Turner, H. Kay
SECOND ROW - A.E. Russell, A.J. Jackson, S.A. Walker, A.H. Oates, L.J. Murray, J.R. McCulloch, W.H. Jones, F.G. Allen
FRONT ROW - J. Martin, Mrs A.E. Money, Miss M.E. Napier, Miss J.M. Stephenson, A.A. Jackson, Miss G.I. Wilson, Miss E.L. Mitchell, Miss N.D. Roche, H.A. Leiper.

Also in 1927 the company moved to Clock House at 195 Elizabeth Street which is still standing (1998) and is now known as Bible House.

The company's greatest achievement was to design, build and install the tower clock for the Brisbane City Council's new City Hall in 1929. It is a credit to the company and the ingenuity of Arthur and his father that this clock is still in operation today (1998).

1935 was a year of major change for the family. Alfred Jackson died. Arthur became Managing Director of the firm, and his son William was indentured as an electrical fitter and mechanic. During World War II Bill and Jock joined the army. Bill worked in the Gympie area repairing and maintaining vehicles, while Jock was returned to the company, which was involved in assisting the allied forces, especially the American forces stationed in Brisbane, in the maintaining of equipment such as teleprinters for the US Signal Corps, and the manufacture of small items which could not be readily obtained through the normal supply system. In 1953 the wholesale trade section of the firm was sold to H. Rowe and Company, and Arthur Jackson continued in the clock business. To avoid high city rents the office was moved from Elizabeth Street to Charlotte Street, Brisbane, and the repair department to Melbourne Street, South Brisbane. A new associated company, Australian Clocks, was established in Leichhardt Street, Spring Hill, where William Jackson

Australian Clocks circa 1956. Underneath the table are Enfield chiming movements to be fitted to Sydney made wooden cases (Oxford Cabinets) visible behind and at the right. The white painted spun aluminium dials housed Smiths synchronous mains movements. The large double dial (with impulse movement) probably went to Innisfail, Queensland.

was in charge of manufacturing and design. Apart from the master/slave installations and public clocks, the company fitted imported mechanical and synchronous movements to cases made in Sydney and Brisbane, including a number of long-case styles using cases by Bell Bros and 3-weight movements by Smiths and Junghans.

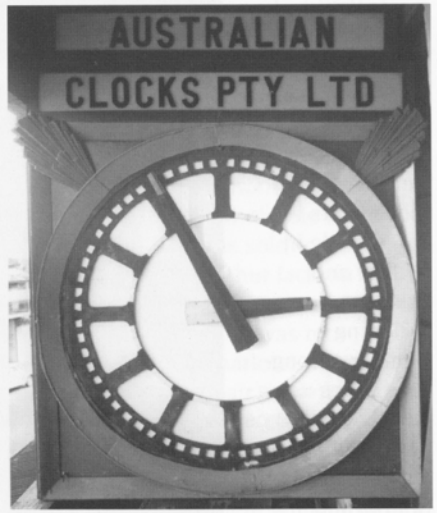
Australian Clocks 1955, 146 Leichhardt Street, Spring Hill (from left) Phil Casey, Pat Doherty and Jock Jackson

Synchronome's display at the Brisbane Exhibition, late 1930's.

Although the dials were not marked, some had Synchronome stickers inside the case or the model name rubber stamped on the back. Large batches of master clocks were also made for Telephone Rental Services in Sydney.

In 1973 the manufacturing section moved from Spring Hill to 288 Montague Road in West End. However, the business suffered badly in the 1974 flood of the Brisbane River when the premises went under some 3 metres of water.
In 1979 Arthur Jackson suffered a severe stroke and his sons William and Jock took over the business, which continued until 1991 when the company was sold as a going concern to Mr Tony Klee.
Tony and the Government Horologist are still responsible for the repair and maintenance of many of the company's clocks throughout Queensland.
Sadly some of these landmarks are disappearing and some are now fitted with modern movements.

Fortunately some of the clocks and systems are being restored and those which are being sold on the open market to private collectors are being restored and used as clocks in their homes.



The clock which adorned the front of the Australian Clocks building in Leichhardt Street Brisbane during the 1950s.

The Synchronome Electrical Co. of AUSTRALASIA, LIMITED.

MASTERS SLAVES AND TOWERS

Versatility was one of the keys to the success of any time keeping system in the period before widespread radio communication. Frank Hope-Jones, the founder of the Synchronome Company in England in 1897, was well aware of this.

Hope-Jones understood that for any time keeping system to be commercially viable it must allow an almost unlimited number and variety of 'slave' dials to be driven from a single 'master' clock or controller, ensuring that all the dials operate synchronously.
The 'synchronome switch' devised with G.B. Bowell in 1895 was Hope-Jones' first attempt to overcome some of the deficiences of electrically operated clocks at that time by separating the electrical contacting and pendulum impulsing functions.

Hope-Jones was an avid researcher of patents, and his lectures, papers and books attest to his wide knowledge of the history and technical details of mechanical and electric horology.

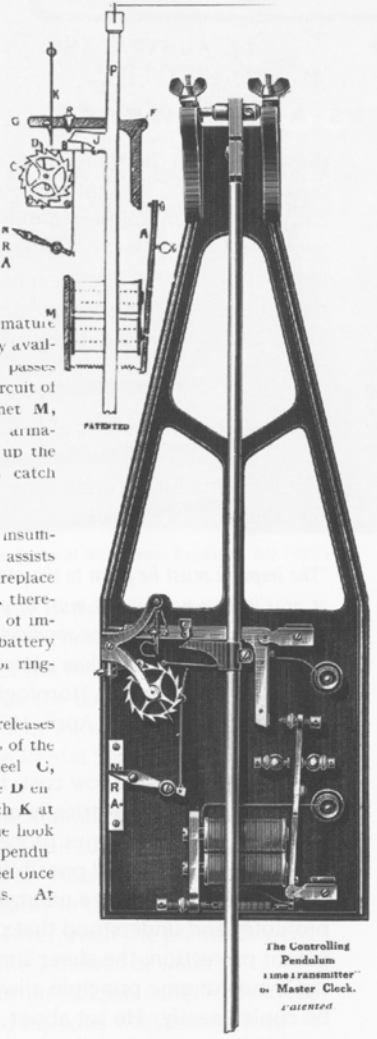
In 1905, following work by Campiche, Palmer and Lowne, Hope-Jones dispensed with the traditional escapement and separated the dial work completely from the pendulum, count wheel and gravity lever. Rather than try to describe the 1905 development, reproduced on the next page are Hope-Jones' diagrams and descriptions of the operation of his controller and slave dial.

By 1923 Hope-Jones was able to satisfy what he regarded as the fundamental requirements for accurate time keeping as;

"The impulse must be given to the pendulum at or near its zero position. It must be given occasionally. There must be absolutely no other interference with the pendulum whatsoever".
(F. Hope-Jones, British Horological Institute Lecture, 19th April, 1923).

Having established a low cost, highly reliable system of electrically operated time keeping, Hope-Jones proceeded to exploit the commercial possibilities of the invention. He was a natural self-promoter and understood that despite patent protection, the sheer simplicity of the Synchronome principle allowed it to be copied easily. He set about establishing agencies all over the world, and also supplied base plates and plans at relatively low cost to amateur clock makers. The sale of the name and Australian patent rights to Alfred Jackson brought in much needed capital at a critical time. Whilst the basic master controller remained the key element of the Synchronome system the market demanded a wide variety of slave dials,

The SYNCHRONOME Co., Ltd. *32 & 34 Clerkenwell Road, E.C. 1*



The Controlling Pendulum Time Transmitter or Master Clock. Patented

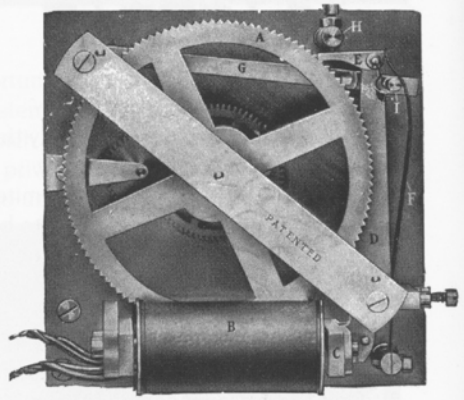
The switch consists of two moving parts: (1) the right angled lever **G** centred at **F** and normally supported on spring catch **K**. Once every half minute the lever is let down, in the act of giving an impulse to the pendulum **P**, upon (2) the armature **A**. Current from any available source then passes through the series circuit of dials and the magnet **M**, which attracts the armature **A** and throws up the lever **G** on to its catch again.

If the current is insufficient, the pendulum assists the magnet **M** to replace the gravity lever **G**, thereby giving **warning** of impending failure of battery by lighting a lamp or ringing a bell.

The pendulum releases the switch by means of the fifteen toothed wheel **C**, which carries a vane **D** engaging with the catch **K** at each revolution. The hook **B** pivoted upon the pendulum **P** turns this wheel once every thirty seconds. At the moment of its release the little roller **R** on the gravity arm **G** is just above the curved end of the pallet **J** down which it runs, giving an impulse to the pendulum **at the moment when it passes through its zero or central position.** Thus the pendulum is free at all times except in the middle of its swing not only is the escapement detached, but it operates at zero, thus realising the ideal which horologists have been aiming at for centuries.

The shape of the impulse surface of the pallet **J** is mathematically produced to yield an impulse, beginning with extreme gentleness, increasing to a maximum at zero, and diminishing in identical ratio.

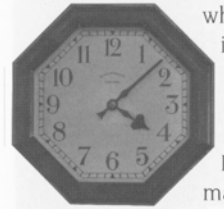
The dials can be readily **set to time** by merely moving the lever from normal to retard or accelerate. In the type illustrated on page 2 this action has been greatly improved. A clutch is provided to engage the pendulum which can be easily hung in position this design facilitates erection, many adjustments being dispensed with.



Dial Movement (Patented).

5

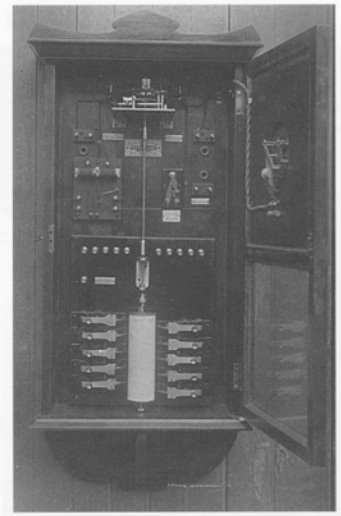
Description of operation of controlling pendulum and slave dial movement from Synchronome (UK) brochure, circa 1920 (rearranged for clarity). Note the arrangement for rapidly advancing or retarding dials, which was not fitted to the Australian clocks. Although this basic design was used for more than fifty years there are many small variations found, especially in the early years, including a push button switch for rapid advancement of the slave dials a count wheel pushed around anticlockwise instead of being pulled clockwise, and the use of a pendulum crutch as referred to above. In the slave dial the 120-tooth wheel A which drives the minute hand is advanced one tooth by the impulse which comes every 30 seconds from the controlling pendulum.



which varied from 3 inches (74mm) to 16 feet (4.8m) and on occasion 60 feet (18m) in diameter. Dials were manufactured in a variety of styles and materials from turned wood for interior use and rolled metal dust-proof dials for factories to cast iron, bronze and aluminium dials and faces for the largest and most ornate public clocks.

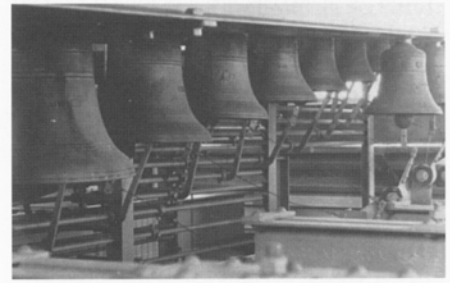
The boom in manufacturing and commerce of the 19th and 20th centuries also created a demand for employee time recorders, bell controllers, watchman's clocks and a variety of one-off devices such as horse race timing clocks, a demand which was readily met at Toowoomba by the versatility of the Synchronome design.

Toowoomba Sports clock

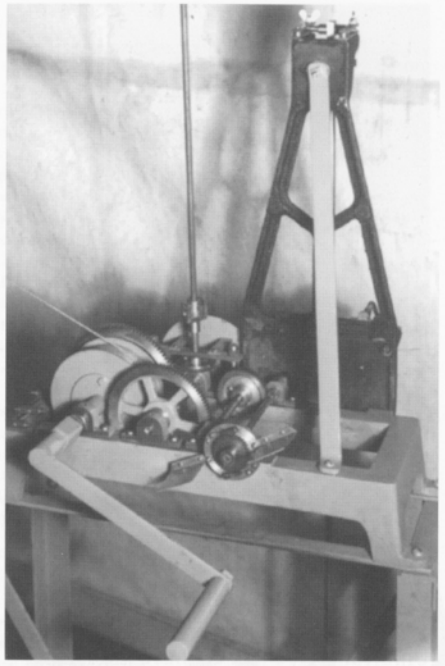


Watchman time recorder.

Unfortunately most of these industrial systems have been lost in factory modernisation and technological change. One specialised system which has been widely preserved is the Shortt Free Pendulum astronomical clock, which was installed in many observatories, including eight examples in Greenwich alone, from 1924 to 1939. Fortunately, many of these precision timekeepers remain in the original observatories and in museums around the world.



Sydney University 9 bell chime and tune, installed in 1928.

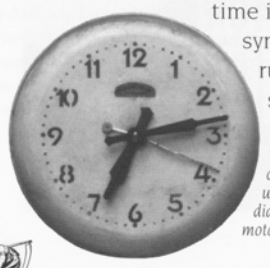


Mechanical clock with Synchronome style gravity escapement. Blackall, 1947.

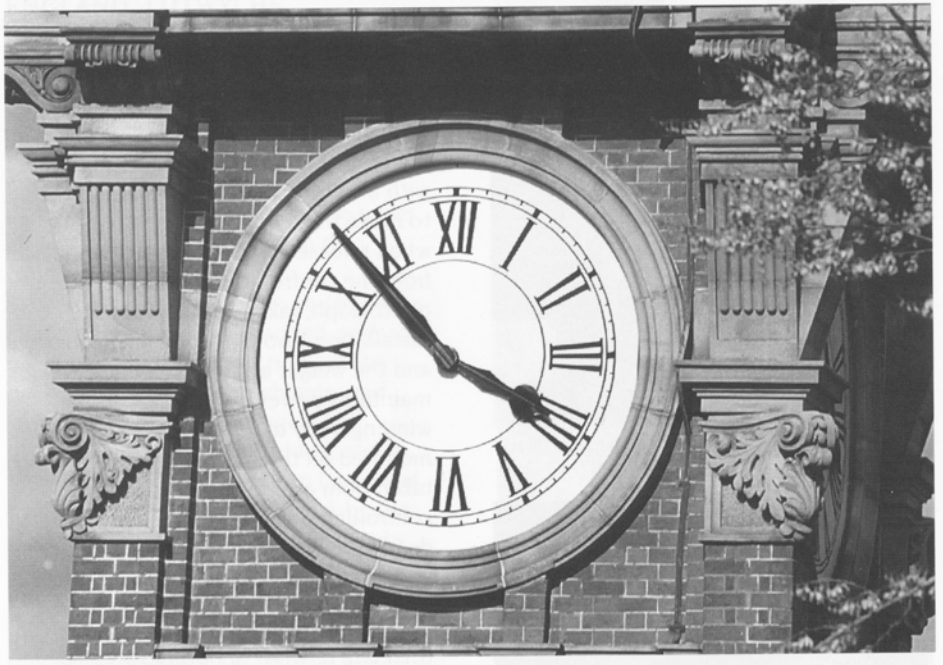
Another application of the Synchronome system was the public clock, often as a turret clock fitted with a mechanism striking a main bell for the hours and additional bells chiming various tunes. Many of these practical and ornamental clocks survive as working clocks today, due to their usefulness and the historical importance of the buildings in which they were installed.

Tower clocks designed and installed by Synchronome companies employed a variety of designs, depending upon the characteristics of the site and the building, the current state of technology and the availability of a reliable supply of electricity. For example, the clock at Blackall was erected where no electricity supply was available. This clock was designed to operate with the gravity arm being reset by a weight driven mechanism which operated the hands. Another important development from the basic Synchronome system was the frequency checking clock, sold widely to regional electricity boards. This clock, shown opposite, ensured that all alternating current generators ran at exactly the correct speed, thereby facilitating the use of common distribution networks, a necessity for widespread reliable power distribution even today. The clock had two extra dials, one a standard slave dial impulsed by the Synchronome master controller and the other, a synchronous motor driven clock, was simply connected to the A.C. generator output. The speed of a synchronous motor is determined by the A.C. frequency. Comparison of the dials indicated whether the generator was running fast or slow compared with the master clock, allowing simple correction of the generator speed and hence the time indicated on all synchronous clocks running from the same generator.

Power station frequency control clock with synchronous mains clock for comparison.



'Austin', mains powered clock made in Brisbane using spun aluminium case / dial and Smiths synchronous motor movement, circa 1950.

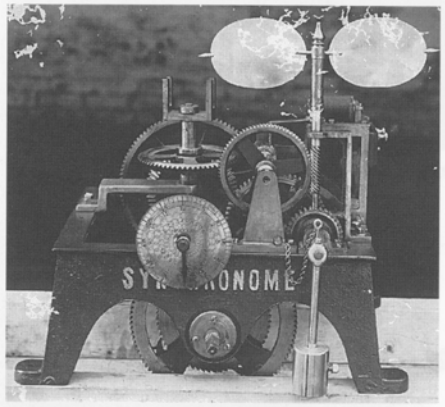


The dial and surrounds of the South Brisbane Town Hall's Clock installed in 1904.

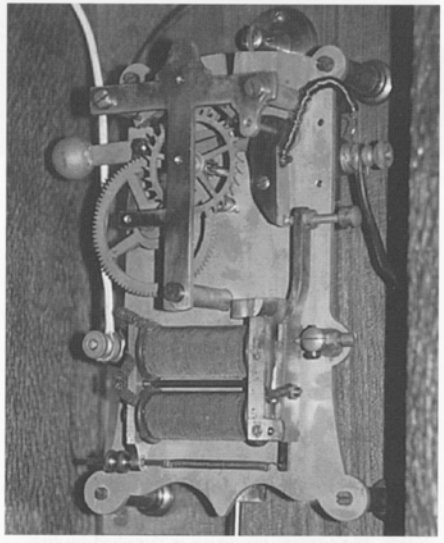
SOUTH BRISBANE TOWN HALL TOWER CLOCK

South Brisbane Town Hall, in Vulture Street, was built in 1892 with an impressive tower with provision for four, six foot (1.8m) diameter clock dials but it was not until 1904 that the council could afford £100 for a clock. This was the eighth installation and the first tower clock built by the company. In December 1904, the Brisbane Courier reported:

"A short time ago the South Brisbane Municipal Council entered into a contract with the Synchronome Company of Australasia for the installation of a synchronome clock in the turret of the South Brisbane Town Hall. The work, which was carried out under the supervision of the manager of the company (Mr A.G. Jackson), was successfully completed a few days ago, and the appearance of the Town Hall is considerably improved as a result of its latest acquisition. The clock is fitted with four dials 6ft 10in. in diameter, which work in conjunction with six smaller ones in the other offices from a seconds beat controlling pendulum placed in the Town Clerk's office. The mechanism of the clock is of a very simple character, and there is a total absence of the heavy swinging pendulum usually connected with other large timepieces. The dials are illuminated by ten incandescent electric lights, the current for which is supplied by the Brisbane Tramways Company. The lighting has been so arranged that the electrical current can be switched on and off automatically. The whole of the mechanism in conjunction with the clock has been designed by Mr Jackson, and manufactured at the company's workshop in Ann Street. Much interest has been taken in the installation of the clock, which is the first of its kind fixed up in Australia."

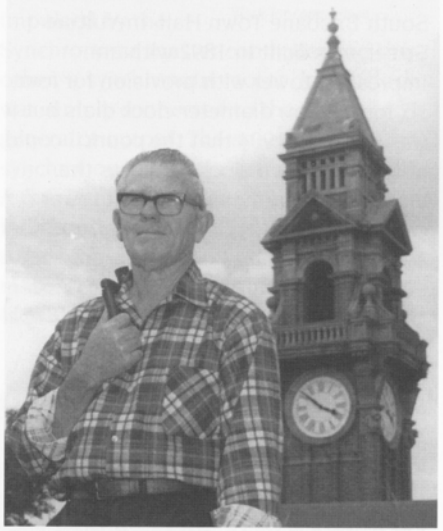


The South Brisbane Town Hall tower clock's mechanism before installation. Photo by A.G. Jackson.



Deadbeat controlling pendulum of South Brisbane Clock.

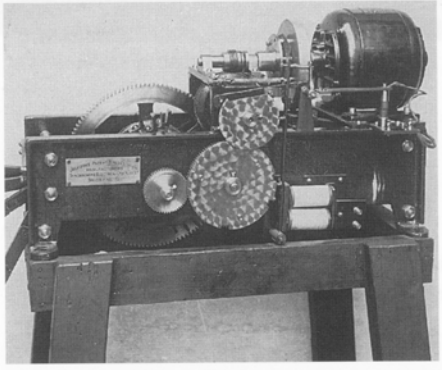
Although the clock was described elsewhere as the "first electrically driven tower clock erected in Australia", it is in fact electrically controlled, but driven by a weight which has been manually wound up each week for nearly 100 years. For many years, including during World War II when the building was taken over by the American Military Police and Prison Administration, this was the particular responsibility of Jock Jackson. In 1978 the job was taken over by Government Horologist Greg Baker. The original installation is still in operation with a simple weight-driven mechanism to move the hands on each half-minute when released by the electrical impulse from the controlling pendulum. The photograph, taken by A.G. Jackson before installation, shows the winding square, and the weight at the right which maintains power to the clock during winding. A fly to limit the speed is mounted on the top of a worm originally taken from a cream separator. The controlling pendulum is of the original deadbeat pre-1905 type in an oak case and was originally powered by 'carporous cells'. It is now located in the tower. Since the dissolution of the City of South Brisbane in 1925, the building has had many occupants but the clock has continued to tick on, in tribute to its maker.



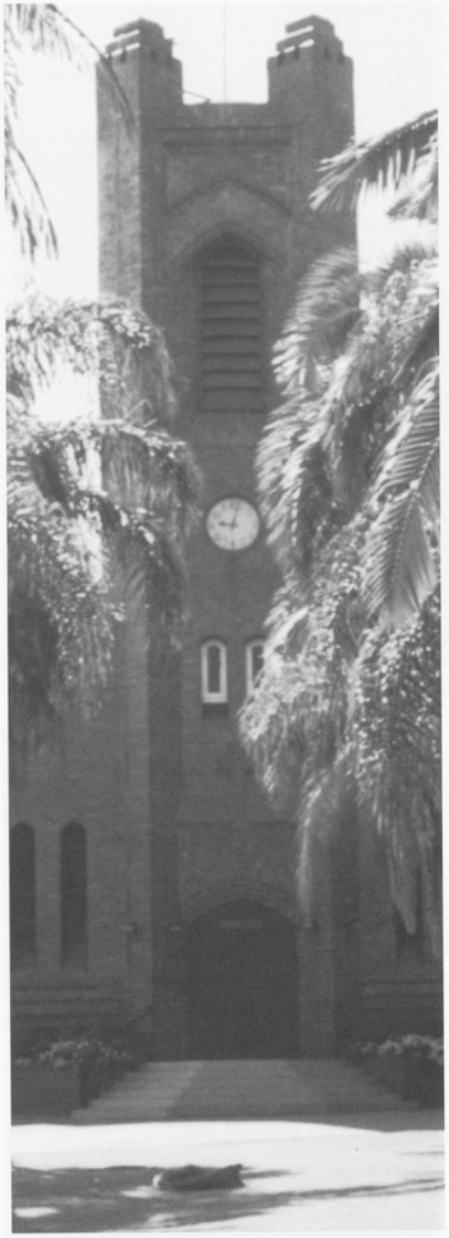
Jock Jackson at South Brisbane Town Hall. (Sunday Mail 1987)

ST ANDREW'S CHURCH OF ENGLAND, LUTWYCHE, BRISBANE.

The clock and bell installation at St Andrew's was presented to the Church by the Jones family in memory of their parents. In August 1926 a 3 foot (900mm) dial was installed in the tower, and a 12 inch (300mm) dial in the church, both controlled by a Synchronome master clock. In 1927 a chime of eight bells was added, with the necessary mechanism to ring out the quarters in Westminster chimes, and strike the hours on the largest bell. In 1929 another bell was added, and in 1938 four more. The bells can be played by hand from a clavier, or struck by the clock hammers. The bells were cast by John Taylor and Co., Loughborough, England and are tuned to the Simpson five-toned system wherein five distinct notes are recognised in the bell and by removing metal in different parts of the bell, these are brought into tune with one another and produce the final note of the bell. The clock, striking and chiming mechanisms are all electrically driven and can be switched on or off at any time. Unfortunately the chime has been switched off for many years.



Chime mechanism for St. Andrew's Church of England, Lutwyche. (Eight bells with Westminster quarters, 1927.)



Lutwyche Church shown with dial.

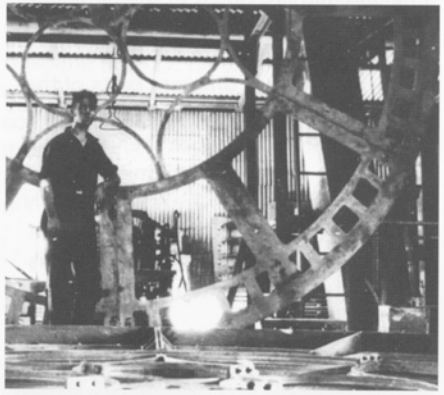
City Hall viewed from Ann Street. Circa 1960.

BRISBANE CITY HALL CLOCK

In October 1927, Synchronome gained the contract to supply a tower clock for Brisbane's new City Hall. The following description is taken from a brochure from c1930.

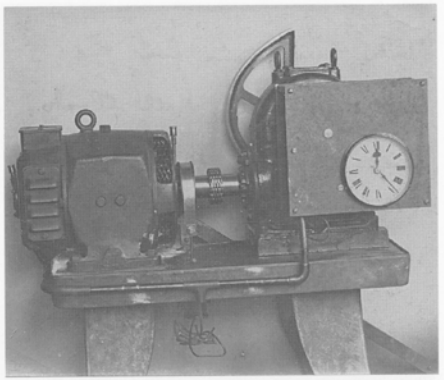
"***The City Hall*** *is equipped with the most modern and complete Electrical Time keeping system in Australia at the present time. The whole installation is automatic. Neither the Master Clock nor any of the dials require any winding up.*

The Clock in the tower *is the largest in Australia and has four dials each 16 feet in diameter, approximately 180 feet above the ground and strikes the hours and chimes the quarters on five bells situated another 50 feet higher.*



Casting the dials. E. Sachs and Co.Ltd., Fortitude Valley. May 1928.

The Dials are of cast iron, the patterns and castings being made in Brisbane and weigh, with glass and fittings, approximately three tons. The design provides the maximum visibility, there being an entire absence of any ornament which would interfere with the purpose of the dial - that is, to indicate the time.

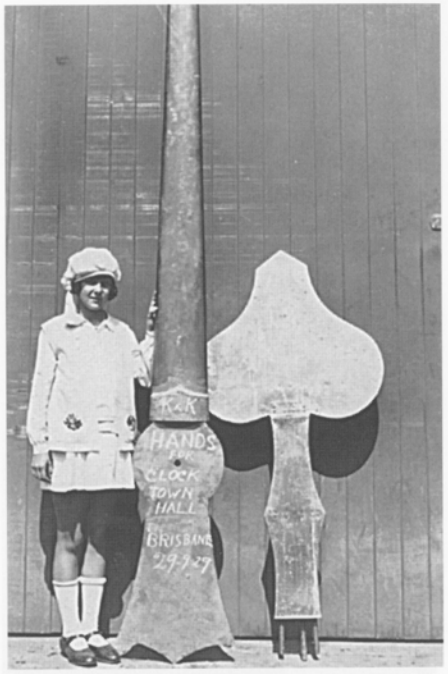


Brisbane City Hall strike mechanism. March, 1930.

The openings in the skeleton framework are filled with white opal, the weight of which is estimated at one ton. To hold the glass in place, three cwt of putty and over 1,000 screws were required. The hands are built up of sheet copper, and run on ball and roller bearings. The minute hand is ten feet long and the hour hand five feet six inches long. The strokes on the dial indicating

Bill Jackson with the chime movement, 1988.

the hours are two feet three inches long and ten inches wide. On account of the lift running through the clock room, it was necessary to provide a separate movement for each face. The hands are driven by a small motor through gearing, which is very ingenious in its design and in a very compact unit, the tremendous reduction



City Hall's enormous hands. (Smith & Atkinson's, coppersmiths)

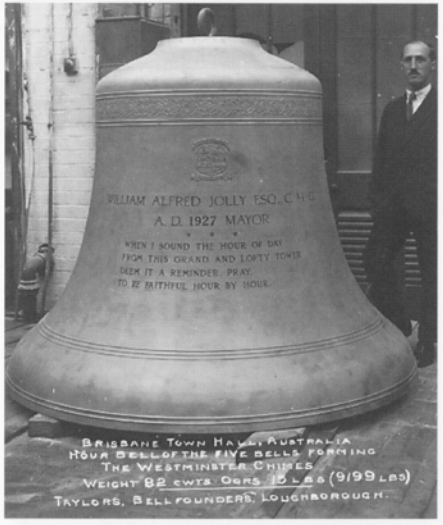
of 43,000 to 1 is obtained. The control device is mounted at the opposite side to the motor and the outstanding feature of the whole clock is its simplicity and absence of complicated parts.

The Time Keeping *is controlled by a master pendulum, which is a duplicate of the slave clock at Greenwich Observatory, from which the world's standard time is controlled. Every half minute the hands of the large dials are moved slowly until they have covered the correct space, and then they are held stationary until the master clock allows them to again progress around the dial.*

The Chiming and Striking Parts *have for convenience been made in two units, each comprising a motor, with reduction drive and cams, with levers to lift the bell hammers and the necessary switching device.*

In the Hour Striking, *the lifting of the hammer of the big bell is done by a cam on the shaft of a worm reduction gear, and the number of strokes is counted by a mechanism on the side of the machine. This mechanism contains several features which are a distinct advance on previous practice in large Tower Clocks. The number of strokes struck by the hammer is controlled by the master clock, and thus the current for the motors may be cut off for any period without interfering with the working of the clock.*

The Chime Part *is controlled in a similar way to the strike part. The clock can be silenced at any time and there is no necessity to go to the clock to set the silencing device, as it can be done either automatically, at pre-arranged times, or manually, by the pressing of a push button in the office 12 floors below the clock. Provision is made to prevent the operation of the silencing device while the clock is striking.*



The hour bell of the City Hall tower clock.

The Electric Supply *is taken from the mains through a rectifier with an automatic change-over to the storage battery originally installed for the emergency lighting of the Concert Hall.*

Application of gold leaf to City Hall's dials on the 10th August 1929.

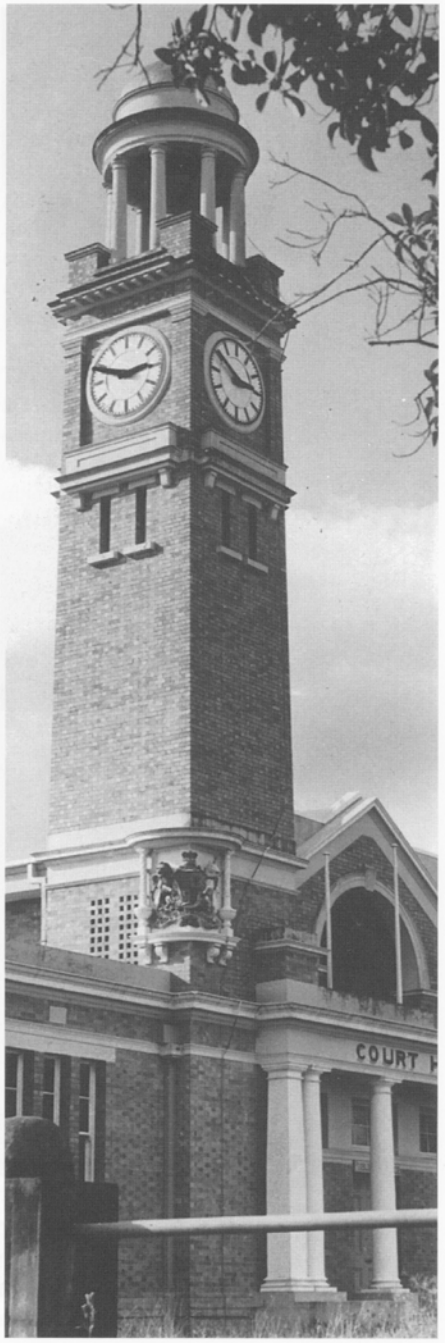
The Bells *are by Messrs John Taylor & Co., of Loughborough who were the first to adopt the Simpson 5 Tone System of tuning bells. The large Bell used for sounding the hours is 6ft 4inches in diameter, weighs four and a quarter tons and has a note A flat.*
The Four Smaller Bells comprise the Westminster, or more correctly, the Cambridge Chime. The notes are C - A sharp - G sharp - D sharp and the weight is approximately 3 tons.

In addition to the tower clock there are 60 dials of various sizes in the different department offices, many of which are of special design and also watchman's clocks and time switches all controlled from the master clock."

Manually tolling the City Hall clock bells on the death of King George V. Bill (right) and Jock Jackson. 1936.

Tolling the City Hall bells 56 times at 12 noon as a mark of respect for the late King George VI. Bill Jackson (right) and David Luke. Brisbane Telegraph 8 February. 1952.

A circuit was also run back to Clock House where comparison could be made with signals from the Queensland Observatory. In 1931, the Courier reported that the clock had set a world record among big clocks by losing only five seconds in two years. Later, a PMG line was used to monitor the sound of the bells. It was necessary to go up to the clock only once a month for maintenance. The master clock was imported from England, perhaps to impress the Council. It is similar to the slave of a Shortt-Synchronome free pendulum system, and was in fact synchronised to another controlling pendulum which was then in the basement, but is now in the Lord Mayor's Conference Room.
This was disconnected in the 1950s, since when the clock has been controlled solely by the master clock in the tower. It has a seconds counter and an eight inch diameter seconds dial, which were never used, as well as a nicely carved mahogany case and an Invar pendulum.



GYMPIE COURTHOUSE

Gympie Courthouse was built in 1901-2, but the tower clock was not installed until 1954. The clock is weight driven but electrically rewound. Normally this occurs every one and a half hours, but the clock can run for many hours without electricity. The mechanism is like a normal Synchronome controlling pendulum but the gravity arm is reset mechanically by the weight drive, similar to the system used at Blackall.

Bill Jackson making adjustments to the dial, 1987.
(Murray Studios)

Jock Jackson carrying out maintenance, 1987.
(Murray Studios)

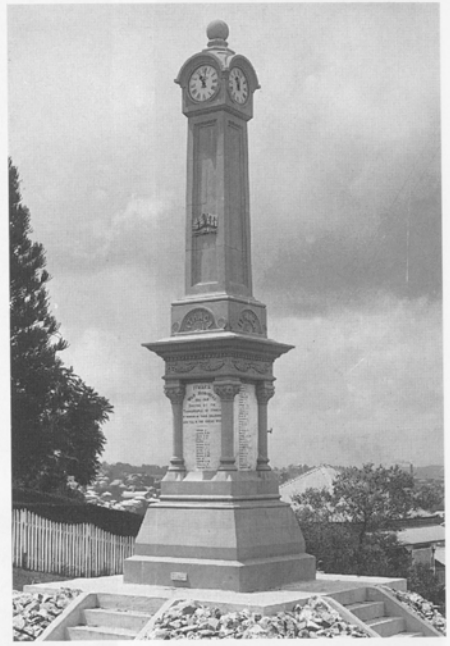
WAR MEMORIAL CLOCKS

"As the illustration .. will show, it is possible, by including a clock into the design of a memorial, to give it greater utility, without in any way detracting from the beauty or sentimental value. The fact is that the latter is increased as the clock makes it more noticeable. Wherever electric current is available the dials may be illuminated from inside. No winding is required, and the master clock may be placed in any building convenient".

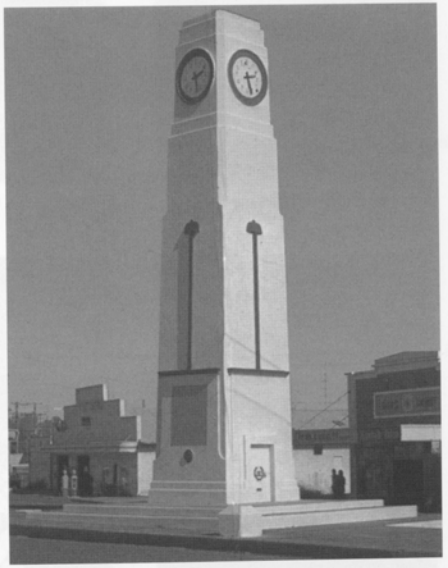
This quote from a company brochure circa 1928 perhaps explains the popularity of memorial clocks in those days. Many Australians had died in World War I and A.G.Jackson's son William was killed near Armentieres in 1916 after surviving Gallipoli.
The Soldiers' Memorial at Ithaca is near the intersection of Enoggera and Latrobe Terraces, and dates from 1922.

The war memorial at Goomeri was not a Synchronome installation but the battery- powered Hipp clock was repaired by the company when the dials were broken by vandals.

War memorial at Bogan Gate, N.S.W. 1922.

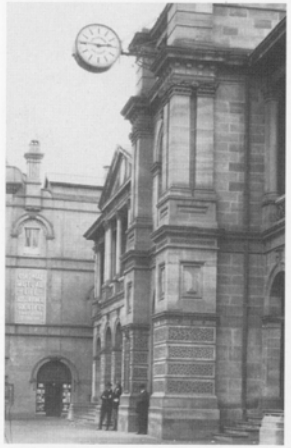


Ithaca War memorial clock, at the corner of Latrobe and Enoggera Terraces, Brisbane, 1922.



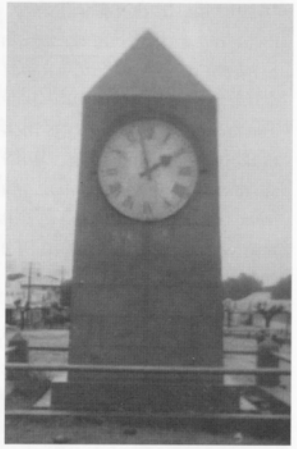
Goomeri War Memorial Clock, with the words "Lest we forget", instead of numerals.

PUBLIC CLOCKS

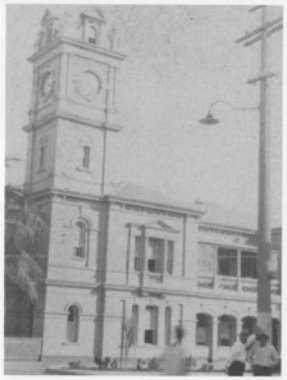


G.P.O. Brisbane, Qld, 1909.

Kilcoy, Qld, 1919.



Augathella, Qld.

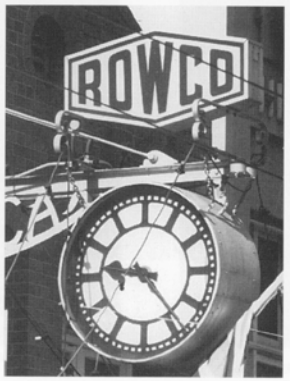


Post Office, Maryborough, Qld.

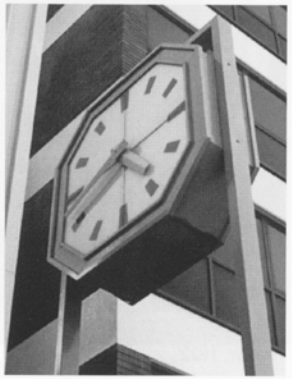
Blackall, Qld. (Blackall Historical Society)

Nanango, Qld, 1935.

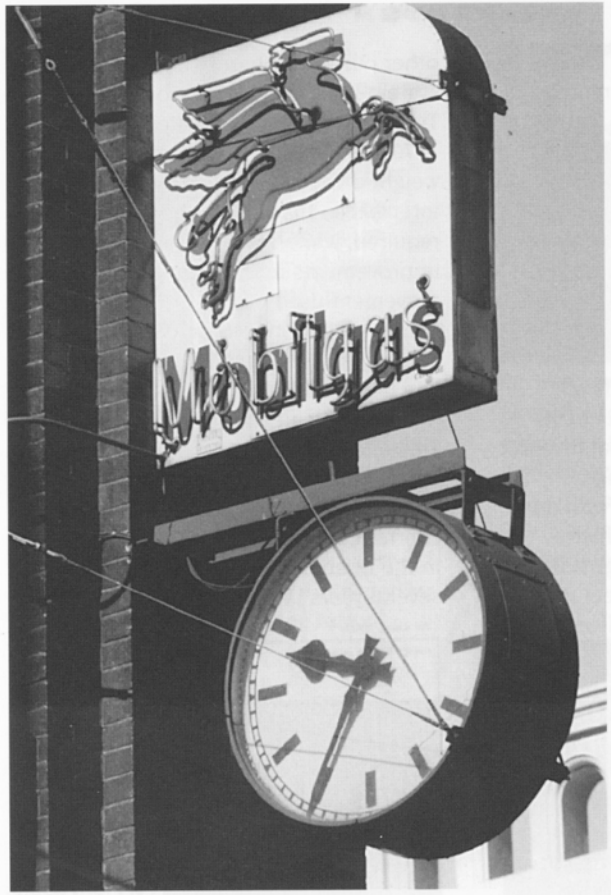
Barcoo Shire Chambers, Qld.



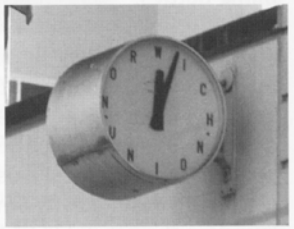
Clock House, Brisbane.



Roma Street, formerly on the State Produce Building Brisbane, Qld.



Finney Isles Store, Queen St. Brisbane.



Norwich Union, Queen St. Brisbane.

Timing Clock, Exhibition Grounds, Brisbane.

These photographs from the company files show something of the variety of public clocks produced. Although the dials are often not signed, Synchronome clocks can often be recognised from the characteristic spade hour hand on earlier models. On those still driven by the original mechanism, the minute hand will advance every 30 seconds. In many cases the original movement will have been replaced by a synchronous motor which requires less maintenance, in which case the hands move continuously.

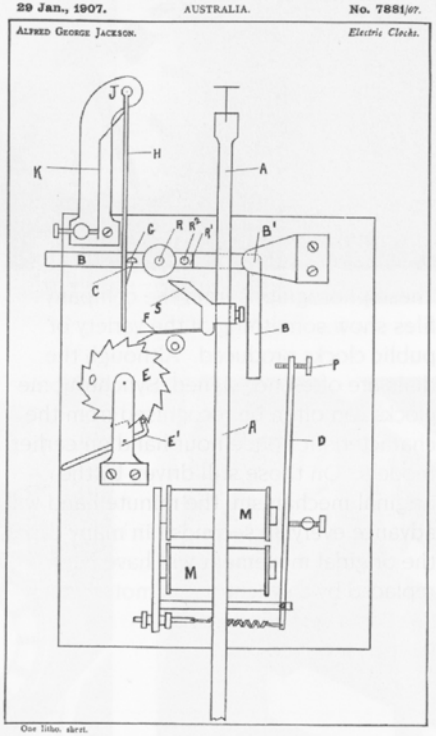
PATENTS

Between 1904 and 1922 Alfred George Jackson applied for, and was granted, a number of Australian patents. These included window sashes (8/11/04), thermostats (5573/06 and 14940/09), cash registers (5573/06), totalizators (7893/07), fire appliances (2253/11) and even display case brackets (4069/21). There was also a magnetically controlled valve (7889/22) for filling bottles.

The list also includes six specifically relating to clocks. The first (4213/05), names Hope-Jones as the actual inventor and covers the basic controlling pendulum switch mechanism, with an electrically reset gravity arm which impulses the pendulum through a flat spring. The 15-tooth countwheel is pushed around rather than pulled as in later versions of the master clock. The company files contain a typescript copy of Hope-Jones' British patent No. 6066/1905 on which the specification is based.

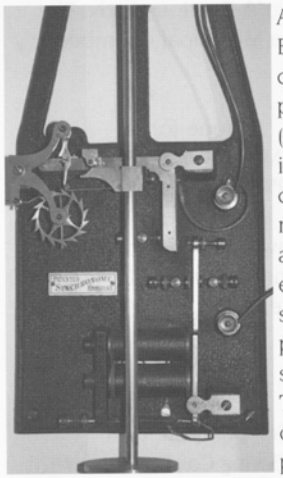
The second (7881/07) shows Jackson as the inventor and decribes a different catch for the gravity arm and introduces the idea of impulsing the pendulum via a roller on the gravity arm and pallet mounted on the pendulum rod.
The application was submitted just four days after Cunynghame and Hope-Jones' British patent application 1945/1907).
The basic ideas are similar but the details are different, with the impulse in the British patent being given in the opposite direction, and Jackson's patent makes no reference to impulsing at the bottom end of the pendulum. Jackson's system is in fact similar to one described by Hope-Jones in the British Horological Journal in 1906. Also from 1907 (9664/07) is "a system of electrical releasing mechanism for turret clock bell striking apparatus and other purposes", along the lines of the system used in South Brisbane Town Hall. The year 1909 saw two patents granted. 15706/09 related to electrical rewinding of weight driven turret clocks at short intervals so that only a short fall is required, while 16017/09 describes improvements in the 'step-by-step' movement used on dials. The latter names Hope-Jones as actual inventor.

The last of Jackson's horological patents was Australian Patent 4343/21.
This relates to the driving of turret clocks, both motion work and chiming and striking, directly by electric motors controlled by a master clock, as was done in the Brisbane City Hall tower clock several years later.

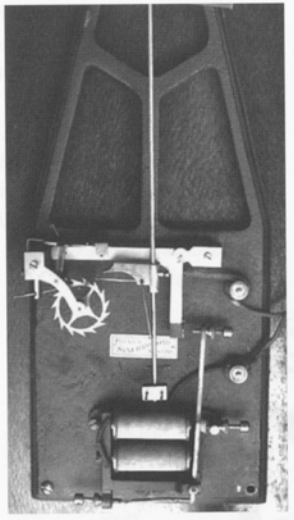

29 Jan., 1907. AUSTRALIA. No. 7881/07.
Alfred George Jackson. Electric Clocks.
One litho. sheet.

A.G. Jackson's patent diagram for 7881/07

MECHANISMS

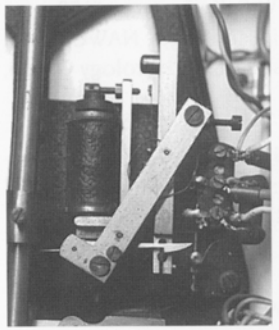


A typical Brisbane-made controlling pendulum (C.P.) A cast iron frame carries the mechanism and is extended up to support the pendulum suspension. The mounting of the impulse pallet on the pendulum is simpler than in the English one as adjustment was achieved at the suspension. Note the weight tray on the pendulum used to adjust the rate of this clock.

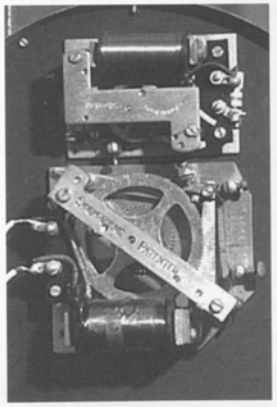


An early (c1910) C.P. with an unusual catch for the gravity arm. In this clock the impulse was given to the pendulum (absent in the photo) via a crutch.

This must have simplified installation but was a complication which was later abandoned.



A seconds counting mechanism, fitted to some master clocks where half minute impulses are too infrequent for timing applications. On each swing, a toggle fitted to the pendulum trips the mechanism which generates an electrical pulse. These devices were imported from the UK. The one shown was fitted to a C.P. in the Physics Department at the University of Queensland in 1958.



Slave dial mechanism. Each pulse from the C.P. advances a 120- tooth ratchet wheel carrying the minute hand by one tooth. These were normally imported from the UK or Germany as it was uneconomic to produce them locally. They were available in several sizes, the most common being the 'two inch' shown here. Above it is a more unusual small impulse mechanism to show seconds, using pulses from the seconds counter shown above.

FURTHER READING

E.G.Crum and W.F. Keller (eds) "150 Years of Electric Horology", NAWCC Ch125, Midwest Electric Horology Group, 1992.

P. Marshall (ed) "Electric Clocks and Chimes", Model and Allied Publications, Argus Books Ltd, 1976.

F. Hope-Jones, "Electrical Timekeeping", N.A.G. Press, London, 1940.

B.K. McKeering "A Gracious Lady, The South Brisbane Municipal Chambers", Brisbane 1992.

F. Hope-Jones, "A Hope-Jones Synchronome Miscellany", TEE Publishing 1995 ISBN 1857611004.

A full scale drawing of a Brisbane-made controlling pendulum is available from NAWCC Chapter 104.

INSTALLATIONS

A few of the early Electric Clock installations supplied by Synchronome Brisbane.

- Ipswich Railway Workshops. 1907
- Townsville Railway Station.
- Brisbane Newspaper Company Ltd. 1904
- McWhirters Ltd. 1905
- National Agricultural Association of Queensland, Brisbane. 1906
- City Electric Light Company, Brisbane.1907
- Brisbane Arcade. 1924
- Brisbane General Hospital. 1936
- New Farm Bowling Club, Brisbane. 1935
- Wunderlich Ltd. Brisbane. 1936
- Charters Towers School of Mines. 1909
- Queensland University and Technical College, Brisbane. 1909
- Smellie and Co., Brisbane. 1914
- Intercolonial Boring Co., Brisbane. 1920
- Brisbane Girls' High School Memorial. 1921
- Government Railways, Perth.
- General Post Office, Melbourne. 1908
- Queensland Masonic Club. 1922
- Burdekin River Meat Preserving Co. 1918
- Bundaberg Presbyterian Church.
- Roma Electric Light Co. Ltd., Roma. 1937
- Fortitude Valley Police Station, Brisbane. 1936
- Nudgee College, Brisbane. 1928
- Bulimba Ferry House, Brisbane. 1922
- Prince Alfred Hospital, Sydney. 1907
- Central State Electric Co., Adelaide. 1908
- Christchurch Post Office, New Zealand. 1910

This is the TRAIN
Jack caught in the morn
And left his neighbours
All forlorn
Cursing the day
That they were born
As they thought of their
Key-wound clocks with scorn
Compared with the Time
Which was uniform
All over the House
That Jack Built

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