The Keysender Number 5 (Keycaller).

Designed in the UK and looking like a small cash register, this machine was developed to allow busy telephonists to quickly store and dial their numbers. Obviously it didn't take many years after the move to automatic exchanges from the slow manual systems, to look for even more time saving developments. The device provides the following functions –

- Receive and store the desired number string using the keys 1 to 9, 0
- Out pulse each digit in turn
- Provide for a 600ms interdigital pause to allow for the telephone exchange switching delay
- Contains a standard "governor" for impulse speed control
- Provides the functions of the dial off-normal contacts

From the mid 1930's, the Key dialer or Key sender №5 was a marvel of engineering that was typical of the early mechanical devices developed in conjunction with the appearance of the automatic exchange selectors. Imprinted on the base of the sender pictured below is *№5 LA, FHR 64/1* – also cast into the underside of the base is the number *51936*

Imprinted on the base of another sender from my collection is *№5 LA, FHR 67/1* – also cast into the underside of the base is the same number *51936*. This base also has the GPO crown emblem and GPO lettering and numbers

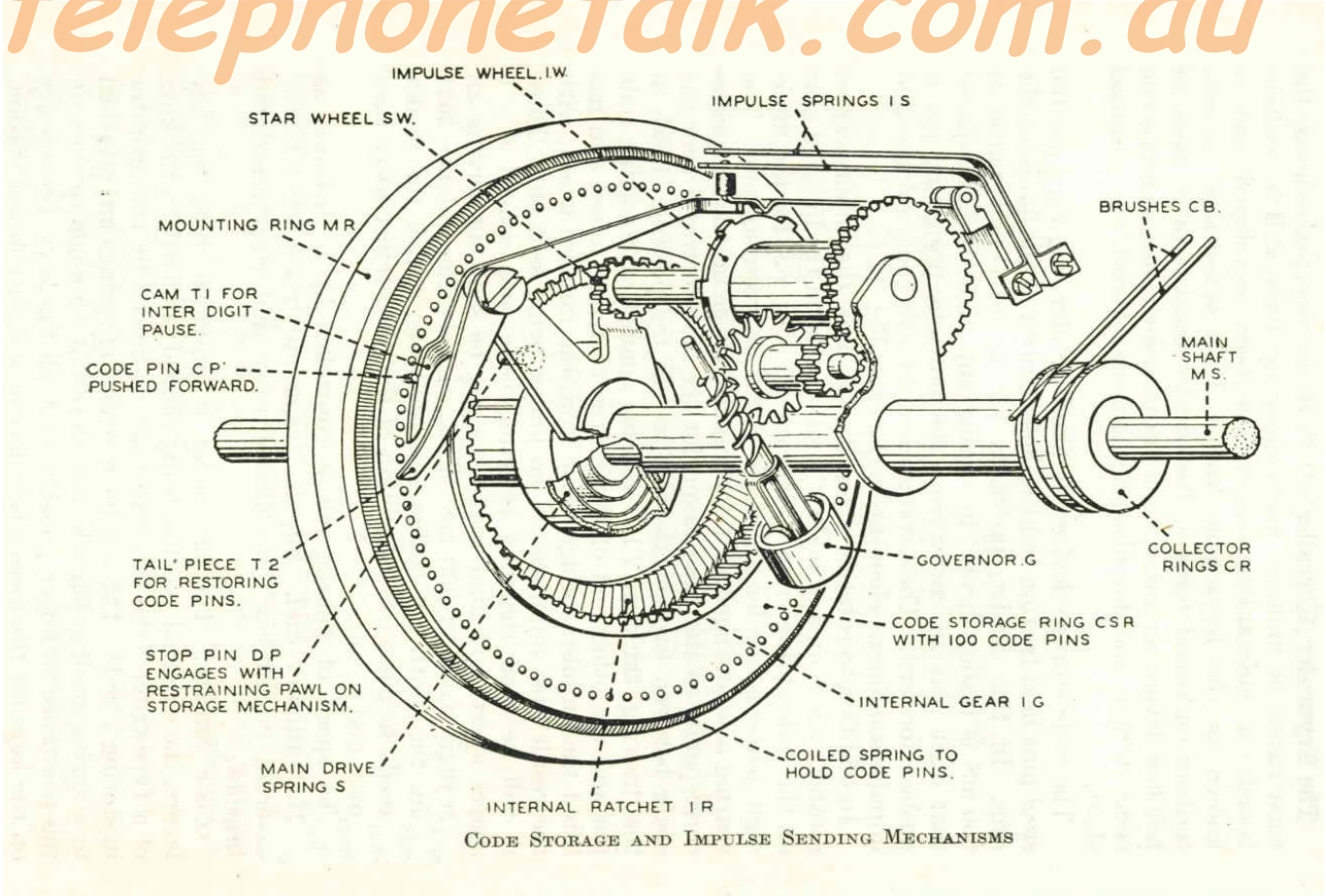
This picture shows another Keysender that is equipped with a five-prong connector to plug into the switchboard dial receptacle.

When this connector is plugged in, the Keysender wiring and mechanics replace all of the dial impulse and off-normal functions carried out in a standard dial - thereby replacing the dial.

SUBSCRIBERS' STATION APPARATUS (copy from TELEPHONY Vol. I (1938) By Herbert and Proctor) (Sic)

The Keysender (Keycaller). With the object of reducing the time taken in dialling, particularly on busy P.B.X. switchboards, a mechanical sender has been developed and is known as the Keysender No. 5. It is obtainable by subscribers on rental terms. The sender consists of a series of ten key levers mounted on a frame which also contains the code storage and impulse mechanisms carried on a central shaft.

The code storage device is a fixed circular ring carrying 100 steel pins held friction tight in holes drilled in the flange of the ring. In this sender, provision for an inter-digit pause of 600 mS is made; hence, in storing any digit, the pin spaced that digit plus six away from the previous projecting pin is pushed forward. The arrangement of the code storage and impulse sending mechanisms is shown in Fig. 52.



CODE STORAGE AND IMPULSE SENDING MECHANISMS

Fig 52

In addition to rotating about its own axis, the impulse wheel rotates by a "sun and planet" motion around the internal gear on the code storage ring. The cam *T/* (Fig. 52) for the inter-digit pause is the length of the space between six pins. The gearing is so arranged that one impulse at the impulsing springs corresponds to the time taken for the cam to travel over the space between two successive pins. In the position shown in the drawing, the cam *T/* is bearing against a projecting code pin and the other end of the cam is therefore raised and has lifted the impulse springs away from the impulse wheel, with the result that impulses are no longer being sent out. Thus, it will be seen that, by selecting code pins spaced *n* + 6-spaces apart, any digit sequences can be sent out having an inter-digit pause of 600 mS. Thus, to take the number 3621 again, the ninth pin is first selected, after which the sender proceeds to pulse out; selection of the pin twelfth away then follows, and so on.

The speed of pulsing out is controlled by a governor, as in the ordinary dial. Impulse trains are transmitted to the external circuit *via* the collector rings and their associated brushes.

Code Storage. The keysender is provided with ten key levers, the external portion being shaped similarly to the keys of a typewriter; the key levers are depressed by the operator in storing a code. The key lever restoring springs are attached to a spring grading bar which is sloped at an angle to even up the resistance to finger pressure over all the keys, the springs on the keys for the lesser digits having a higher initial tension.

When operated, all the digit keys travel through the same distance. The key pressures are light, being about 1 Ib. 12 oz.

The code storage mechanism is shown in Fig. 53. Each digit key is provided with an adjustable shoe, *AS,* so that the point of engagement with the storage rocker *RPI* can be adjusted accurately. The movement of the storage rocker on the depression of a digit key is communicated to the storage pawl, PI, through the bracket *B2,* link *LI,* and bracket *BI.* The storage rocker is tapered so that for equal downward movements of the key levers, the correct angular movement of the storage pawl for each digit is obtained: when storing the digit " 1 " the storage pawl has an angular movement of 25° 12', and of 56° 36' when storing the digit "0." The storage pawl turns the ratchet wheel, *RW,* (Fig. 54), which rotates about the main shaft *MS* (Fig. 53). On release of the digit key, the storage pawl returns to the stop *PS2* under the pull of the spring $4. The ratchet wheel is carried back for a short distance until the locking pawl is operated by the locking lever.

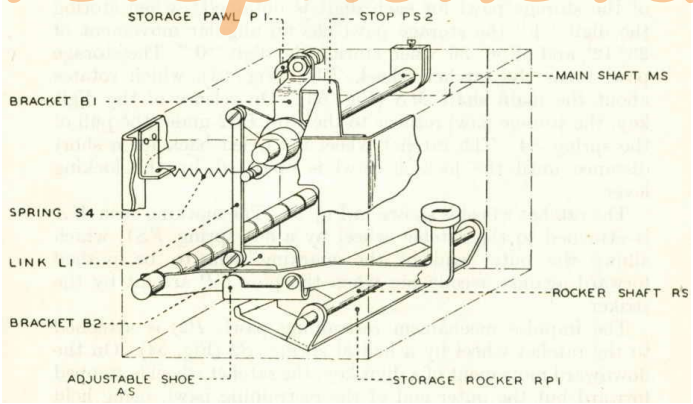


Fig 53a

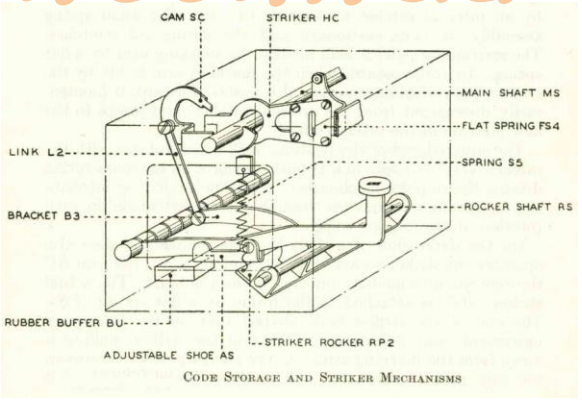


Fig 53b

The ratchet wheel is shown in Fig. 54. The marking arm *MA* is attached to the ratchet wheel by a flat spring *FSI,* which allows the outer end of the marking arm to be pushed forward against a code pin when the pins *CP* are hit by the striker.

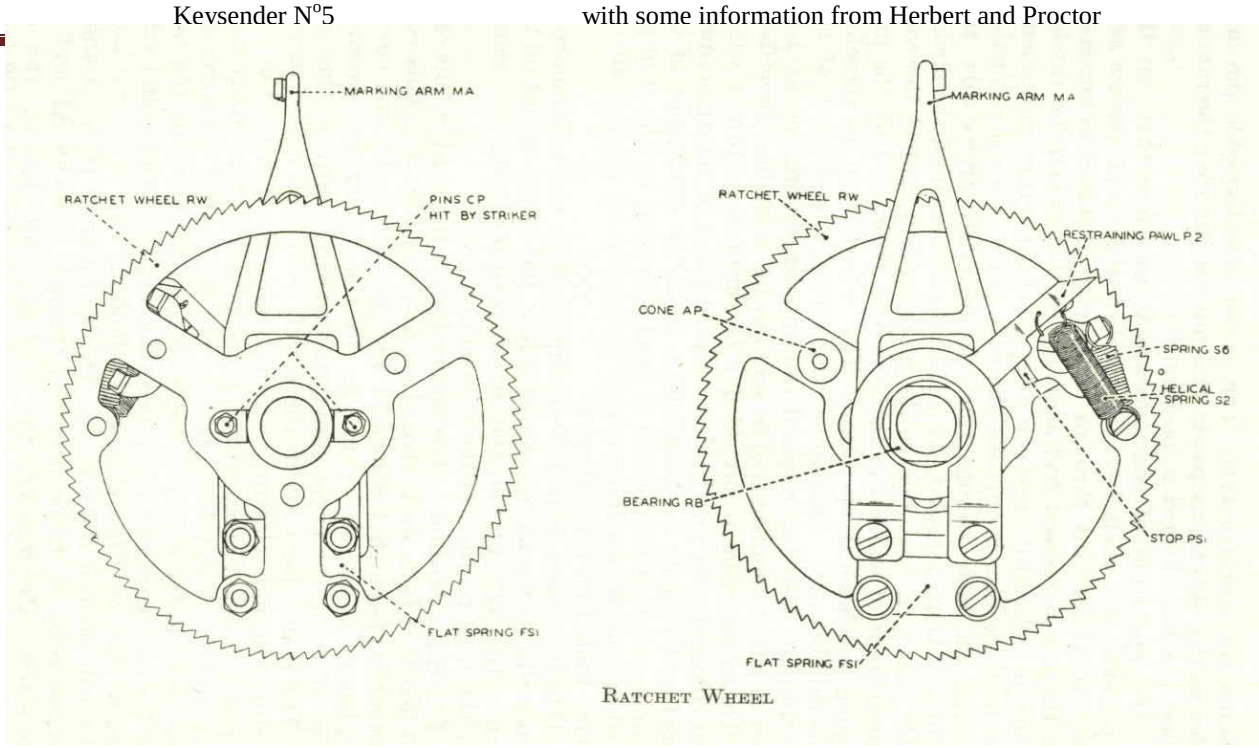


Fig 54

The impulse mechanism restraining pawl, *P2,* is attached to the ratchet wheel by a helical spring, *82* (Fig. 54). On the downward movement of a digit key, the ratchet wheel is stepped forward but the outer end of the restraining pawl, being held by an internal ratchet associated with the off-normal spring assembly, remains stationary and the spring *S2* stretches. The restraining pawl is held against the marking arm by a flat spring. In consequence, when the marking arm is hit by the striker, the restraining pawl is also pushed forward, is momentarily disengaged from the internal ratchet, and jumps to the new position of the ratchet wheel.

The squared end of the bearing, *EB,* which rotates with the ratchet wheel, engages in a D-bush anchored to the main spring driving the impulse mechanism; the impulse driving mechanism is therefore wound up through the correct angle on each rotation of the ratchet wheel.

On the depression of a digit key, the adjustable shoe also operates the striker rocker (Fig. 53), pulling down the cam *SC* through the intermediate bracket £3 and link *L2.* The actual striker, *HC,* is attached to the frame by a flat spring, *FS±.* The end of the striker is so shaped that on the downward movement cam *SO* passes in front of the striker, pulling it away from the marking arm. On the return journey, however, the cam passes behind the end of the striker, so pushing it against the marking arm. This action sets the code pin and releases the restraining pawl; this must occur after the ratchet wheel has been locked in position.

The operation of code storage is therefore that, on the depression of a digit key, the ratchet wheel and marker arm are moved forward through an angular distance determined by the key depressed and arranged so that, when the ratchet wheel is locked into position after its slight return movement, the marking arm is opposite the code pin *n* + 6 spaces further around the code storage ring. Immediately afterwards, the digit key being released, the cam *SO* passes behind the striker *HC* which, in turn, pushes the marking arm against the code pin in front of which the arm has been positioned by the preceding mechanical operation. The selected pin is therefore pushed forward. Meanwhile, the forward movement of the restraining pawl has released the impulse-sending mechanism, and impulses commence to be sent out in the manner described.

The mechanism is provided with off-normal springs which are changed over on the first forward jump of the restraining pawl and remain in this position until the movement of the impulse-sending mechanism is finally arrested by the stop pin striking the restraining pawl on completion of pulsing out the digits stored on the code ring.

It will be seen from the description that the mechanism is unique in that it has no zero position, but comes to rest on the completion of any call, the actual position being determined by the final position of the restraining pawl.