

The Poundage Printing Mechanism for Machine Issued POs

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On acquiring the machine issued shilling Postal Order shown below, I started my usual search into who, when, where, why and how.



These appear to be easily answered by reading the ink on the paper. The who is the Post office, the when is the 5th August 1952, and the where is Frederick Street in Edinburgh. That it's a machine issued postal order from one of the five locations trying the new machines goes some way towards the why and the how is answered by the few surviving photographs of the machines in action, which have appeared in the pages of PON over the years^(1,2).

The last two questions however, are open to further scrutiny. For an experiment that lasted several years, why were there only a few locations using the machines? It would become obvious quite quickly if this new technology was a success, with machines being rolled out to many other, if not all post offices. There are several obvious advantages in having values printed on demand at the point of sale. The centralised printing of the blank POs with just the serial number becomes much simpler with no need to track and supply the demands of each denomination. The machine doing the printing can also automatically totalise the issued value and received poundage, almost eliminating the need for stock taking of the PO drawer⁽³⁾. The downside must be in the practicalities of using the machine. The teller sets the date at beginning of the day and then for each customer the value in shillings and pence, activates the printing mechanism and out slides the PO. It is unlikely that this could be achieved more quickly than reaching into a drawer, pulling out the required book of preprinted POs, affixing any penny stamps and date stamping by hand.

The format of the machine issued POs also meant that they had to be sorted separately from the preprinted orders⁽²⁾. If the perforations in the machine issued orders are indicative of the serial number, then there is nothing on them to allow automatic sorting by value or even a simple first sorting by colour. There is also the printing mechanism itself, which has to be reliable, and high quality. We now take much printing technology for granted with laser, ink jet, and bubble jet printers which have no moving parts beyond the paper feed. The machine issued POs are printed mechanically using letterpress and inked pads. If something goes wrong during the setting or printing process, this will lead to significant issues of resetting and accounting. It is clear from the above illustration that the poundage printing has slipped and is between three half pence and two pence. Depending on how this registered in the totaliser, there is a potential for a ½d error at the end of the day. Less

significantly, and despite the large locating perforations at each end of the PO, the printing of the denomination is not well aligned relative to the preprinted boxes and text.

Once the customer has requested the Postal Order, the first part of the operation involves setting the required value in shillings and pence using the knobs at each end of the machine. In doing this, the machine automatically sets the poundage. The design for mechanism for doing this has been found in the UK Patent Office⁽⁴⁾. The sections below give some of the description from the Patent.

We, BELL PUNCH COMPANY LIMITED, of 39, St. James's Street, London, S.W.1, a British company, and VERNON WATKINS SPARROW, of 1, Oxford Gardens, Denham, Buckinghamshire, a British subject, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention concerns machines for printing and issuing forms (hereinafter referred to as forms of the character described) relating to money transactions wherein there are two separate money values to be taken into account the magnitude of one of which varies in dependence upon the magnitude of the other, but in a non-proportionate manner.

The invention more especially concerns a machine for printing and issuing Postal Orders. As is known, a Postal Order carries two money value markings upon it, one representing the exchange value of the Order and the other the poundage value. The magnitude of the poundage value increases with that of the exchange value. The increase is, however, in steps each embracing a range of successive increases in the exchange value. The result is that although the poundage value increases in dependence upon the exchange value it does so in a non-proportionate manner.

Heretofore Postal Orders have had the exchange and poundage values pre-printed upon them, although where the exchange value is a value between 6d. and 1s. or between an odd-number multiple of 6d. and 1s. or a multiple thereof, or in the case of a higher-value Order, between two successive multiples of 1s., a form is used the exchange value of which is that of the nearest 6d., or in the case of a higher-value Order, the nearest 1s. below the required value, and the latter value is made up on the form by the application of postage stamps thereto. The date of issue of the Order, also the postal district of the office of issue, are usually stamped on the form by the clerk issuing it.

As applied to machines for printing and issuing Postal Orders, the object of the invention is to provide a machine in which at least the exchange and poundage values and preferably also the other data mentioned, are printed on the form at the time of issue thereof, blank forms being used in the machine, drawn from a supply thereof accommodated in the machine.

This introduction sets the scene for the main invention and variations that are described in the subsequent pages.

The invention comprises certain additional features, which are severally described in what follows herein and are specifically claimed in the accompanying statement of claim. The said additional features include features relating to the constructional details of the setting means for the various type elements of the machine; of the means for inking the type elements; of the means for feeding the forms to be printed to printing position in the machine and then delivering them after the printing operation to a position at which they may be removed from the machine for use as required, and of certain mechanisms embodied in the machine for ensuring that the machine shall be automatically locked against operation in certain events hereinafter described.

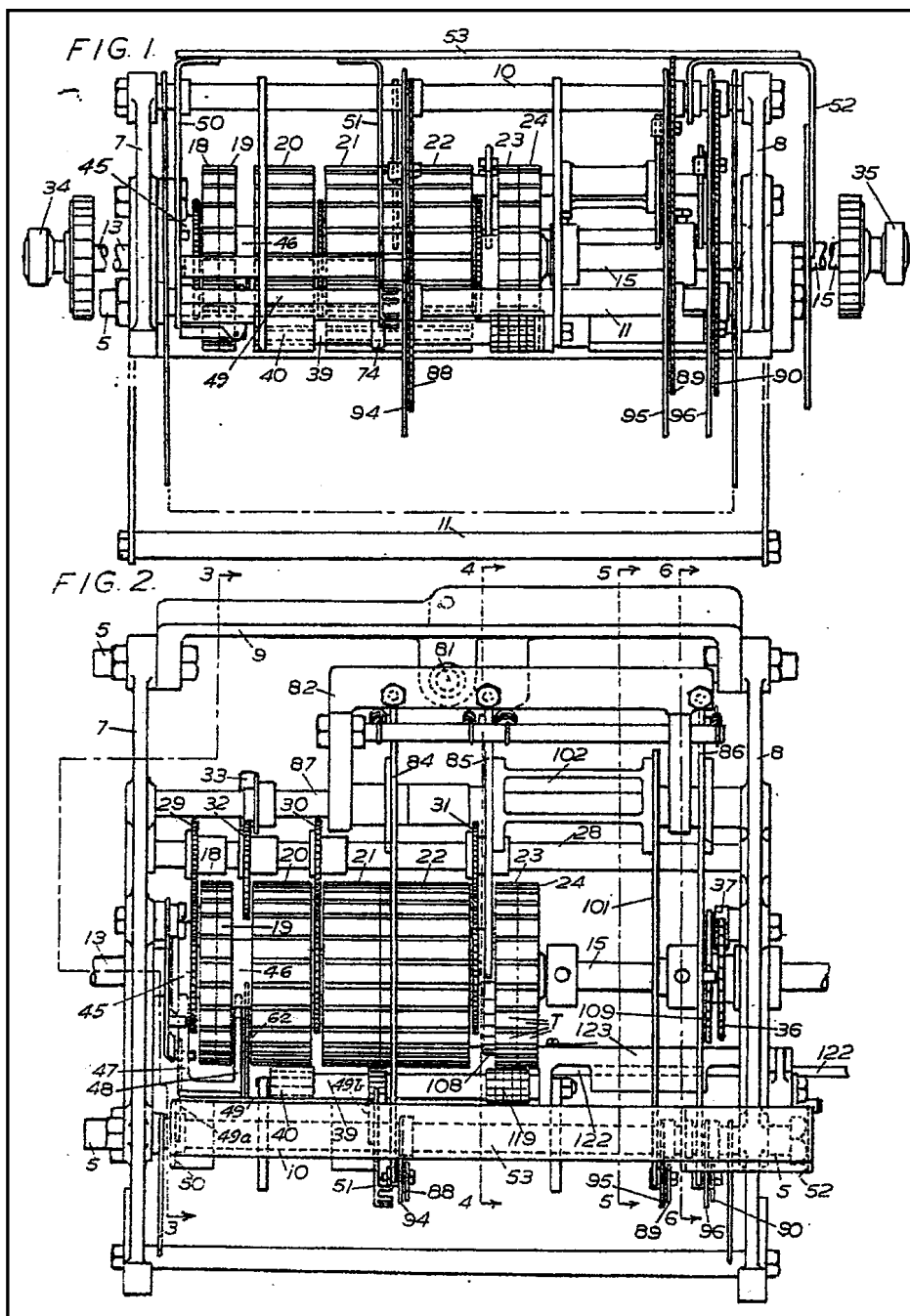
The possibility of misuse of the machine has been thought about and whilst still being easy to use, the proposed machine can be broken in half and the mechanism put away for safekeeping.

In the case, for example, of a machine for printing and issuing Postal Orders, the upper unit in such a two-part construction will generally be readily removable from operative position over the lower unit to enable it at the end of a period of use of the machine, for example at the end of the day, to be removed and placed under lock and key to prevent tampering with the totalising mechanisms of the machine by some unauthorised person, it being understood that a machine in accordance with the invention would generally incorporate a mechanism or mechanisms for automatically totalising the "primary" and "secondary" values printed on the form as issued by the machine. In such a case it is highly important, of course, that provision shall be made against tampering with these mechanisms, and a two-part construction as visualised above has this desideratum especially in mind. In addition, it enables a machine to be designed which is more readily portable by reason of the fact that it is constructed in two parts which can be transported separately.

There is then a very long section describing in every detail how the mechanism works. The detailed drawings cover every aspect of the mechanical construction and operation. The device is a masterpiece of mechanical engineering, with shafts, cams, feelers and gear mechanisms all working together to produce the correct printing on the Postal Order as well as the correct poundage to be printed on another part of the order.

Fast with this shaft is a drum 40 carrying on four successive portions of the periphery thereof four flats 41, 42, 43, 44 (see Figs. 9 to 14). These four flats carry printing type. The type on flat 41 prints a "blank" marking, while the type on the flats 42, 43 and 44 print respectively the words "PENNY", "THREE HALFPENCE" and "TWO PENCE", which represent the poundage values of the Orders to be issued in the machine, corresponding respectively to the following ranges of exchange values:— 6d. to 1s. 5d.; 1s. 6d. to 5s. 11d.; and 6s. to 21s. 11d.

The main part of the printing mechanism is shown below (significantly reduced)



The Patent then goes on to describe how the blank forms are fed, the type is inked and the Postal Order printed.

The form strip is maintained in proper contact with the various guide surfaces guiding it to the printing position, by a series of flexible wipers 165 carried on a spindle 166 revolvably mounted in bearings 167, 167 on the carriage and normally maintained in operative position by a tension spring 168 pulling downwardly upon the free end of an arm 169 fast on the spindle 166 against a fixed stop 168a, the operative position of the arm 169 and therefore the pressure of the wipers 165 on the form strip being adjustable as necessary by a set screw 170.

Also mounted on the carriage is an inking roller 171 (Figs. 15, 17 and 18) whose function is to ink the type on the various type elements of the machine. This roller is absorbent at the periphery and is normally charged with ink.

Beneath roller 171 is a second ink charged roller 172. This roller is maintained in pressure contact with roller 171 by springs 173, 174 (Figs. 15 and 18) pulling inwardly upon the free extremities of the downwardly directed limbs of a pair of bell cranks 175, 176 pivoted at 177 to a part in stationary relation to the framework of the carriage, roller 172 being carried in bearings on the free extremities of the other (horizontally directed) limbs of said bell cranks.

Inking roller 171 is driven, at a peripheral speed which is equal to the speed of traverse of the carriage, and in a direction which is such that the roller rolls on the face of the type as it inks the same, by drive from a stationary rack 178, transmitted through gearing 179. The arrangement is such that the roller 171 inks all of the type elements of the machine, including those of the dating device, also the two type blocks which print respectively the Office of issue and the Code Letter of the Issuing Clerk. It will be understood, of course, that the parts 171, 172, 173, 174, 175, 176 and 179 all move with the carriage in the reciprocation thereof.

The actual printing operation is performed by a pair of pressure rollers 180, 181.

The printing operation has now been effected and the final motion is the feeding of the form strip forward one step, by the action of the feed wheels 156, 157 and feed roller 158.

This results in (a) delivery of the printed form to an exterior position with respect to the machine at which it is torn off and (b), in the case of an Order whose exchange value is 10s. or over, the marking on the form as it is delivered to this position of a distinguishing line 112 in, say, red ink by the marking roller 113.

As is typical with Patents, the design may not have been implemented in exactly this manner. Other embodiments or options are also considered, some of which are taken up and others fall by the wayside during the practical construction of the device.

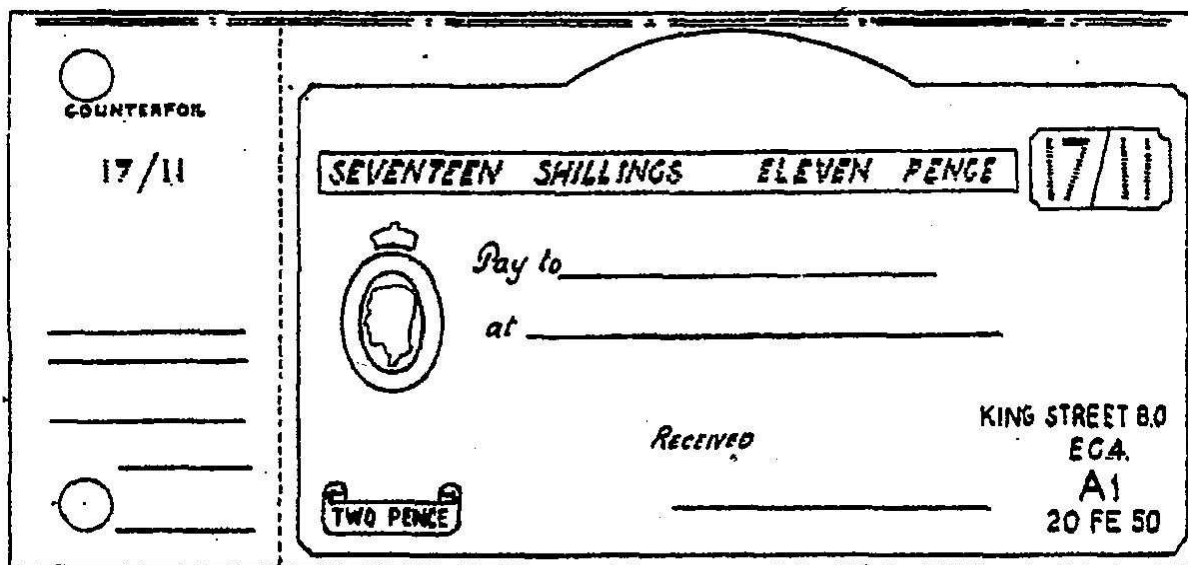
In this case the printed parallel lines that fill up the space either side of the printed values are considered, along with the option for a motor drive and manual drive of the mechanism.

It will be seen that the pressure roller (180) which prints the exchange value on the Order is peripherally grooved with fine closely spaced grooves. By this means the exchange value is printed on the Order in letters and numerals which are made up of a series of closely spaced lines extending parallel to the direction of length of the Order. Characters in this form are more difficult to tamper with and alter than ordinary solid line characters.

If desired the machine may embody means for operating it by hand. Such means (which are not shown) may conveniently comprise a turning handle, say at the right hand side of the machine, suitably connected to the driving connection between the motor 61 and the various motor driven parts of the machine, at a point therein convenient for the integration thus of the two drives—the power drive and the manual drive. Any desired arrangement may be employed in this respect.

The next section describes the process of removing the freshly printed Postal Order from the machine

A final drawing shows how the machine issued Postal Order with its printed value and poundage was expected to look.



It is interesting to note that the date shown on the Postal Order illustrated in the Patent is a week after the Patent was filed. The GB patent was granted on 30th July 1952, probably having been pushed through in order to cover the device before the hardware was released to the Post Offices after the trials at Romford.

In order to gain coverage abroad, the same Patent was filed at the US Patent Office in February 1951⁽⁵⁾, though was not granted until May 1956, which suggests that a machine of this type was not used in the US.

Almost all of the complexity of the machine arises from the printing of irregular poundage rates through the range of denominations available. This is achieved using a mechanism that has very many moving parts and close tolerances. With this in mind, it is not surprising that problems might occur during the operation, such as misaligned printing. This also raises another point of practicalities; the user will have to be trained, not only in how to make the settings, but also to spot when something is going wrong. When the machine stops working, the teller will still need a drawer of preprinted Postal Orders to provide the service.

The mechanism described here only covers the printing of the denomination and the poundage and the form feed for the blank Postal Order. This consists of over 200 components. When the parts for printing the date and name of the issuing post office are considered, along with the totalisers, this becomes a very complex and certainly expensive piece of machinery.

A further subtle issue is that the poundage rates are set by cams which mean that if the poundage changes across the range or just one change point is moved, the machine will have to have one or more new cams fitted. Looking at the mechanism, this would require considerable mechanical skill.

The practicalities of use; training, day to day operation, servicing and repair, separate sorting from normal Postal Orders, combined with the cost and complexity of manufacture make it surprising that the experiment lasted as long as it did. A further speculation on the end of the machine issued Postal Orders is that the experiment was continued until the last batch of blanks (ZE prefix) was exhausted. To keep in line with the Elizabeth II new issues, would have required a new design for the machine issued blanks.

Whilst much of the above discussion is speculative it may go some way to providing a reason why only a very small number of machines were ever made and used in just a few Post Offices.

As each machine will have its own characteristics, such as flaws in the printing type, if enough machine issued Postal Orders could be brought together for study, it might be possible to work out the total number of machines used and the number of Postal Orders issued by each machine before failure. Looking at the number of known surviving machine issued Postal Orders, this is probably not possible⁽⁶⁻⁹⁾. However, the Post Office had meticulous accounting procedures, so the data probably exists somewhere in an archive.

References and Sources

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