

Faradic Batteries and Coils.

Faradic batteries and coils are made in an endless variety of patterns, but they all work on the same principle. The batteries and coils we now list are the latest improved patterns of the type most generally in use and that have proved the most efficient, convenient and reliable. For these reasons they are recommended, but we can always supply any other patterns or parts.



Faradic Battery, by Dr. Spamer.

This is a very convenient and efficient battery and quite the best of the low priced ones. Of sound construction, light and compact.

Provided with four terminals, two for primary current, the former being much stronger than the latter. By merely sliding a little metal tube in and out of the coil, perfect gradual regulation of both currents is obtained from very weak to very strong. A crank switch "on" and "off" is provided and the battery is operated by a dry cell of large size, No. 142.

The box is of walnut, highly finished, with plated handle and hook fasteners. Drawer for accessories, including a pair of silk covered cords, a pair of polished wood handles, two pad electrodes of different sizes, one tinzel brush electrode, and one button electrode.

Order No. 100 Size 5 in. x 5 in. x 6 in. high - - - - - \$1 5 0

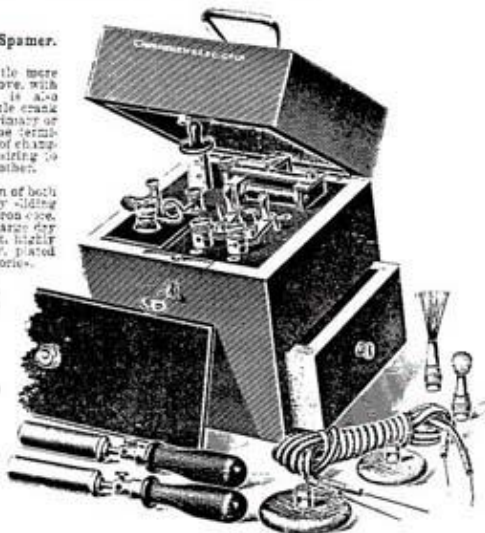
Faradic Battery, by Dr. Spamer.

This battery is of a little more elaborate design than the above, with a separate interruption. It is also fitted with an additional little crank switch for directing either primary or secondary current to the same terminals, obstructing the access of the same to the wire over when desiring to pass from one current to the other.

Perfect gradual regulation of both currents is effected by simply sliding up and down the graduated iron case. With on and off switch and large dry cell, No. 142. Box of walnut, highly finished, with lock and key, plated handle and drawer for accessories.

Including accessories as above, with one extra pad electrode.

Order No. 102 Size 5 in. x 5 in. x 6 in. high \$1 25 0



For more information and prices see our list of batteries.

Faradic Batteries and Coils.

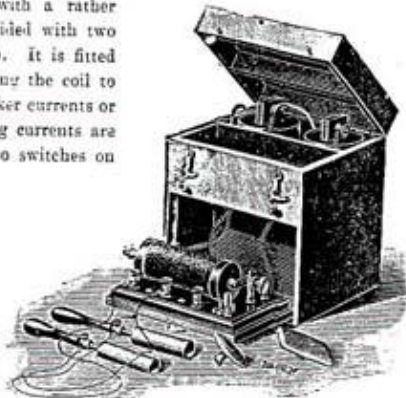
Eros Faradic Battery.

This battery is provided with a rather larger induction coil and is provided with two extra large dry cells (No. 2420). It is fitted with a little crank switch, enabling the coil to be worked with one cell for weaker currents or with both cells when very strong currents are required. The same switch also switches on and off.

Three terminals are provided, the centre and one outside one, for secondary current and the centre with the other outside one for primary current. Perfect gradual regulation of both currents is effected simply by sliding in and out of the coil a nickel-plated tube.

The box is of highly polished walnut, with handle, hook fasteners and compartment for accessories. Including accessories as No. 102.

Order No. £1 18 0



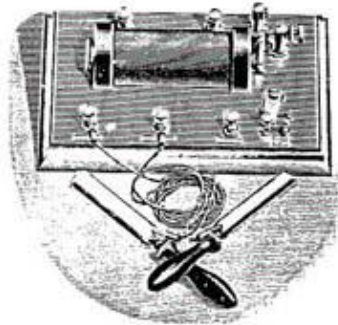
Faradic Battery, with separate interrupter enclosed in case with glass top. With three terminals providing primary and secondary current. In this battery a perfect regulation of either current from very weak to very strong is effected by turning the little milled ebonite handle round the circular scale. This handle also switches the current on, and ensures that the battery is always started with the weakest current, thus guarding against a mistake. It works with two extra large round dry cells (No. 2420) the same as the Eros.

Contained in highly finished wood case, with leather handle, hook fasteners and compartment for accessories. Including accessories as No. 102.

Order No. £2 0 0

Full instructions for working are sent with each Battery.

Faradic Batteries and Coils.



Simple Induction Coil for Faradisation, mounted on polished walnut base with moulded edge. lacquered fittings. With 3 terminals, giving primary and secondary currents. With nickel-plated draw-tube for regulation of strength. Including a pair of conducting cords, a pair of polished wood handles, and a pair of plated metal tubes.

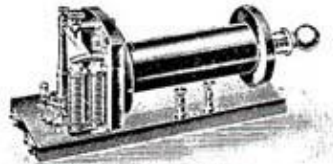
<small>Order No.</small>		<small>s. d.</small>
108	... ..	9 0
116	Same, with "on" and "off" switch (Fig.)...	10 6

Works with any dry or wet cell.

Special Coil for Hydro-Electric Baths.

Primary Current only.

This is a large and powerful induction coil, especially for hydro-electric baths, though equally useful and efficient for all other work. It is made to give only primary current because it is known to be of greater value for electric water baths than is the secondary current. It is mounted on a polished walnut base and fitted with a little crank switch and six studs for bringing into use different layers of the windings. In this way six different degrees of strength are obtainable between extreme limits, and each different strength can of itself be gradually regulated from weak to strong by simply moving in and out the graduated iron core.



The coil is covered with polished black celluloid and is of best make and finish in every detail. Size of base 9 in. x 3 in.

<small>Order No.</small>		<small>£ s. d.</small>
120	(Fig.)	£2 10 0
124	Same, but fitted with special interrupter enabling very slow interruptions to be obtained when desired. Illustrated and described on next page...	£2 15 0

This coil works with one or two dry or wet cells, or from the main if suitably arranged. (See page 42.)

Galvanic Batteries.

For Galvanisation, Ionic Medication and Electrolysis.



Galvanic Battery. Simple Type.

This is the simplest type of Galvanic Battery. Instead of having a cell collector, the front of the box is provided with small metal holes into which the connecting cords are plugged, thus bringing into use any number of cells desired. If only a single cord was used the circuit would be broken every time the number of cells was changed, and all the cells (perhaps 20 or more) would be brought into action at once, thus causing most unpleasant shocks to the patient. To obviate this a forked cord is supplied, this preventing the breaking of the circuit and enabling the number of cells to be gradually increased.

One branch of the forked cord must be pulled out immediately the other is plugged in. If both are left in for some seconds one or more of the cells are short-circuited and spoiled.

With best quality dry cells. Polished oakwood box with handle and hook fasteners. Well and strongly made.

Including one pair of silk covered cords, one pair of polished wood handles, one flat-covered electrode and two circular pad electrodes.

Order No.	Order No.
210 With 8 <u>dry cells</u> ... £1 12 0	218 With 28 <u>dry cells</u> ... £3 12 0
212 " 12 " ... 2 0 0	220 " 32 " ... 4 2 0
214 " 18 " ... 2 12 0	222 " 40 " ... 5 0 0
216 " 24 " ... 3 3 0	

Galvanic Batteries.

For Galvanisation, Ionic Medication and Electrolysis.

See page 21 for Special Ionic Medication Outfits.



Galvanic Battery. Best Type.

These batteries represent the highest class of galvanic battery, nothing superior being made. They are provided with a crank collector for regulating the strength of the current gradually by bringing the cells into use one by one. This collector is mounted on a polished ebonite base, with a spring fitted to the crank to secure always a good contact and with a second spring dropping into little depressions opposite each stud, so that the crank handle is left fair and square on the top of any one stud. If left bridging across two studs, as otherwise often happens, one cell inside is short-circuited and spoiled.

The dry cells are of best quality. The box is of dark polished fumed oak, best hand made and highly finished. The whole of the very best class in every detail. *Milli-ammeter mounted on pillars.*

Prices:—Complete with a pair of silk covered cords, a pair of polished wood handles, two pad electrodes, one button electrode and one tinsel electrode:—

Order No.		£	s.	d.	Order No.		£	s.	d.
230	With 10 dry cells ...	2	15	0	250	With pole reverser ...	3	5	0
232	" 20 "	4	0	0	252	" "	4	10	0
234	" 24 "	4	12	0	254	" "	5	2	0
236	" 28 "	5	4	0	256	" "	5	14	0
238	" 32 "	5	16	0	258	" "	6	6	0
240	" 40 "	7	0	0	260	" "	7	10	0

If with best D'Arsonval dead-beat, moving-coil type milli-ammeter to measure the strength of the current, either Order No. 178 182 0-5, 0-50; or Order No. 170 4 0-15, 0-160, extra £2 4 0.

If milli-ammeter with only one reading, 0-25, Order No. 186/8, extra £2 0 0.

Same batteries with double cell collector, £1 5 0 extra for 20 and 24 cells, or £1 10 0 extra for 28, 32 and 40.

Combined Batteries.

For Galvanisation, Ionic Medication, Electrolysis and Faradisation.



The galvanic portion of these batteries is exactly as specified on page 15, while they are provided, in addition, with a **Faradic Coil by Dr. Spamer**. Extra large dry cells are supplied for working the coil, which is of the type of O.N. 102, giving primary and secondary current. These batteries are invariably fitted with a pole reverser and with a Watteville switch. The former for reversing the direction or polarity of the galvanic current and for giving shocks to the patient for electro-diagnostic purposes, for muscle testing &c. The latter is for directing either galvanic or faradic current to the same two terminals and for combining them.

Including Pole Reverser, primary and secondary switch and complete with a pair of silk covered cords, a pair of polished wood handles, 3 pad electrodes, 1 tinsel brush electrode and 1 button electrode.

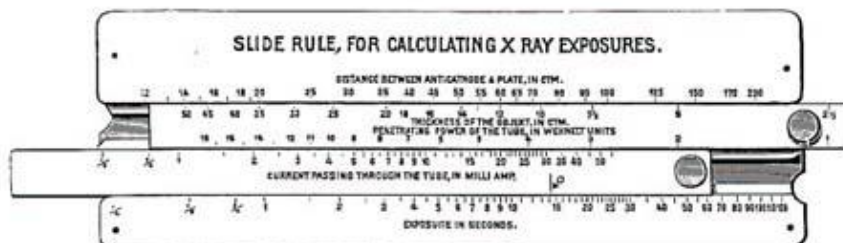
Order No.		Order No.			
270	With 20 dry cells ...	£6 8 0	274	With 28 dry cells ...	£7 12 0
272	" 24 " " ...	7 0 0	276	" 32 " " ...	8 4 0
<p>Same Batteries with best D'Arsonval type, dead-beat moving-coil Milli-ammeter, either O.N. 178 182 (0-5, 0-50) or O.N. 170/4 (0-15, 0-150) £2 4 0 extra.</p> <p>If Milli-ammeter with one reading only, viz., O.N. 186 8 (0-25) 2 0 0 ..</p> <p>If with Watteville switch, the prices increase... .. 0 10 0</p> <p>If without pole reverser, the prices reduce 0 10 0</p> <p>Same batteries, with double cell collector 1 5 0 extra for 20 and 24 cells, £1 10 0 extra for 28 and 32 cells.</p>					

The Milli-ammeter is always mounted on pillars.

Slide Rule for Calculating X-Ray Exposures.

Price - - - £0 10 0

In white celluloid, with clear black lettering.



This is a very convenient little instrument for ascertaining the time of exposures, on the lines laid down above. The first scale signifies the Distance between Plate and Anti-cathode, the range being from 12 to 200 cm. The second scale of figures stand for the thickness of the object, with a range of between $2\frac{1}{2}$ up to 50 cm. The third scale represents the penetrating power of the Focus Tube in Wehnelt Units, from 2 up to 18. The fourth scale represents the milli-ampere used and covers from 0.5 up to 50 milli-amperes.

The two slides are moved until the figures for the Distance, thickness, penetration and milli-ampere are opposite to one another, when the index on the second slide points to the number of seconds required for the exposure. These figures are on the fifth scale as shown in illustration, and cover a range of from $\frac{1}{4}$ to 120 seconds.

Intensified Spark Coils.

TECHNICAL CONSTRUCTION.

In every detail our coils are of the very highest class. Only the very best material is employed, and the greatest care is taken in every stage of their manufacture. The secondary wire is double silk insulated and is wound upon a porcelain tube, this constituting the very finest insulation. Outside, the secondary coil is surrounded by a polished ebonite cover, and the two shaped end-cheeks of the coil are of **massive solid ebonite**.

The primary coil is wound with the best insulated wire and is wound round an iron core of the best quality. It is covered outside with insulating tape and then the whole enclosed in a **massive polished ebonite tube** of more than $\frac{1}{4}$ in. thickness. **This primary tube is completely removable from the secondary.** This enables the coil to be handled more conveniently and also permits a primary coil wound for a different voltage to be used with the same secondary, so that should the coil be required to work on a different main at any time it is a very simple and inexpensive alteration. It will thus be understood that between the primary and secondary wires there is a massive ebonite tube, a porcelain tube and other insulation. Compare these statements now with other coils—they are made with the primary fixed inside the secondary, which means that any repair or alteration necessitates the dismantling of the whole coil. In some cases the secondary coil is wound direct on the primary coil, there being no insulation between the two coils other than the silk—and often only cotton—covering of the wires. When it is remembered the enormous voltage that comes into question it will readily be understood why it is these coils so often "spark through" between primary and secondary. When this occurs it invariably means that some sections of the secondary are completely burnt out, necessitating a very expensive and difficult repair. We do not know of any other coil provided with ebonite cheeks to the secondary—they are all of black polished wood to represent ebonite. Obviously the ebonite is of advantage, and it is equally obvious that the wooden cheeks effect a saving of some three or four pounds per coil.

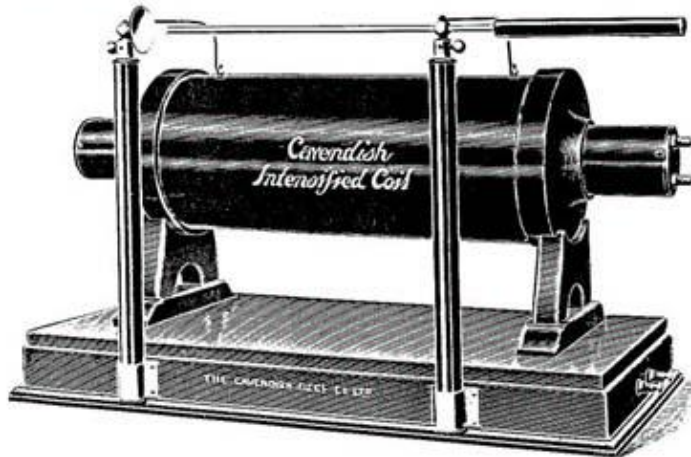
As we are only supplying coils of the very highest class, we naturally do not in any way attempt to sacrifice efficiency for the sake of effecting a saving in cost. Even so, our coils are no more expensive than those of other makers, and in many cases are cheaper. This is, of course, only possible when one has had long experience, specialising in this branch of X-ray equipment.

All our coils are wound on the latest approved **multiple section principle**. In every respect their design, construction and finish is of the best. Mounted upon their polished wood bases—the usual mounting and recommended—or mounted upon white marble switchboards or in any other way, they present a very handsome appearance.

They represent the result of many years' experience in the construction of large spark coils for X-ray work, and in conjunction with our centrifugal motor mercury interrupter they constitute the perfect high tension generator. We should always be very pleased to place our coil and interrupter in comparison with the coil and interrupter of any other maker, confident that the combination cannot be excelled in any respect.

Cavendish Intensified Spark Coils.

Our new Intensified Spark Coils are constructed to meet the essential modern requirements in relation to short exposure radiography. They are capable of giving the most intense discharges as will be gathered when we state that 80 or more milli-amperes are easily obtainable across an 8 in. air gap by a 16 in. coil working with our Centrifugal Motor Mercury Interrupter. This output enables instantaneous radiographs (one-hundredth second) to be taken of the heart and all other parts with the exception of pelvis. As a general rule nothing is gained by taking a radiograph instantaneously, but everything is gained so long as the pictures can be taken in one or two seconds. At the same time it is essential that perfect control shall be obtainable, that the discharge from the coil can be regulated down to moderate power for ordinary time radiographs and screen examinations and to weak discharges for working soft tubes as in therapeutic treatment. In conjunction with our Centrifugal Motor Mercury Interrupter all these conditions are complied with.



Cavendish Intensified Spark Coils.

Mounted on finely polished oakwood base, with necessary condenser inside base. For working with our Centrifugal Motor Mercury Interrupter or any other type of mercury interrupter.

With point and plate discharge rods mounted on the large ebonite terminals of the coil.

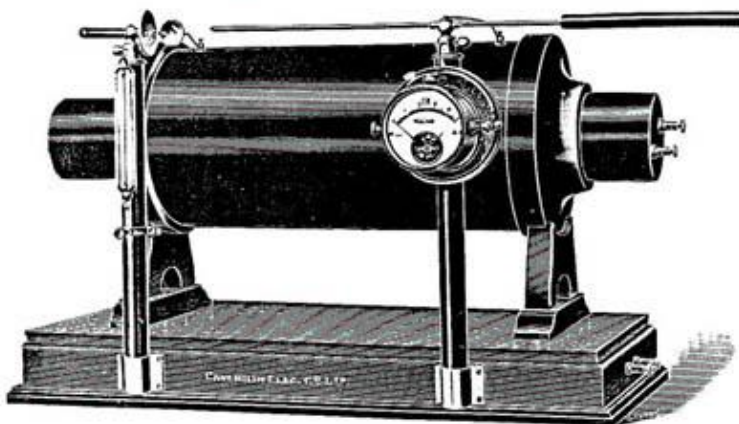
Order No.	Spark Length.	Price.
9000	8 in. ...	£18 0 0
9002	10 ,, ...	21 0 0
9004	12 ,, ...	26 0 0
9006	14 ,, ...	34 0 0
9008	16 ,, ...	41 0 0
9010	20 ,, ...	60 0 0

With point and plate discharge rods mounted on separate pillars as illustrated above.

Order No.	Spark Length.	Price.
9030	8 in. ...	£19 0 0
9032	10 ,, ...	24 0 0
9034	12 ,, ...	27 0 0
9036	14 ,, ...	35 0 0
9038	16 ,, ...	42 0 0
9040	20 ,, ...	61 0 0

The mounting of the discharge rods on separate pillars as illustrated is much more satisfactory, being much stronger and more convenient. If only mounted on the ebonite terminal of the coil the long rod swings round and the movement of the rod is not smooth and even through the terminal. The rod is graduated in inches with the 0 against the right hand pillar when spark gap is closed, so that as the rod is drawn to the right the actual spark gap in inches is seen at a glance. This gap represents the equivalent spark of the focus tube as referred to in the reading matter on preceding pages.

Cavendish Intensified Spark Coils.



The illustration above shows a convenient method of mounting the Milli-ampere Meter, and an Oscilloscope Tube. If ordered at the same time as the coil, the milli-ammeter and oscilloscope will be mounted in this manner without extra charge, a remark which applies to either one or both. The milli-ammeter is listed under Order No. 9880 and costs £3 5 0. The oscilloscope tube is listed Order No. 9890 at 15s. 0d. Coils must be as Order No. 9090-9010.

If desired a little series spark gap can be arranged between one pillar and one terminal of the coil. In this case the terminal of the coil is modified to take the form of a small plate, while a sliding point or rod is made to work through a hole in the metal fitting on the head of the pillar. Such a series spark gap is all that is necessary for suppressing the little reverse current which is sometimes set up by the peculiarities of certain focus tubes. Extra 10s. 0d. See page 181.

Cavendish Intensified Spark Coils.

If the coil is intended to work with an electrolytic interrupter it is necessary to have a variable primary coil. Three variations are sufficient, and they consist in switching the windings of the primary in "Series," "Parallel" and "Series-Parallel." These different degrees of self induction are best controlled by a crank switch on the switchboard, which requires to be manufactured accordingly. If intended only for working with an electrolytic interrupter there is no necessity for a condenser, but if the coil be intended for use with both mercury and electrolytic interrupters, then a condenser becomes necessary.

With Condenser.			Without Condenser.		
Order No.	Spark Length.	Price.	Order No.	Spark Length.	Price.
9060	12 in. ...	£29 0 0	9080	12 in. ...	£25 0 0
9064	16 " ...	44 0 0	9084	16 " ...	39 0 0
9068	20 " ...	63 0 0	9088	20 " ...	57 0 0

If with discharge rods mounted on separate pillars as per previous page £1 0 0 extra. If arranged with series spark gap as referred to above, total increase £1 10 0.

Any coil insulated with specially hard wax for tropical climates 5 per cent. extra.

case. It will improve the output of any coil beyond recognition, but its greatest efficiency is only possible where the coil, the condenser and other factors are in harmony. As we have mentioned in our few remarks regarding our intensified spark coils, the interrupter and coils are specially constructed to suit one another taking every factor into due consideration. Together they constitute the ideal combination. The accuracy with which the coil and interrupter are suited to one another is clearly proved by the fact that an oscilloscope tube placed in circuit will betray no reverse current whatsoever with any air gap exceeding an inch. Since no X-ray tube has such a low resistance as to be equivalent to an inch air gap, it follows that the reverse current is reduced to a negligible quantity altogether. This is perhaps the most important condition of all, which will be fully understood after perusal of our remarks on reverse current, which occur in the description of "focus tubes."

In this same connection see reproduction of Oscillograms on pages 180 to 183.



Centrifugal Motor Mercury Interrupter.

With motor wound for any voltage continuous current from 12 volts (accumulators) to 250 volts. Complete with the necessary small quantity of mercury.

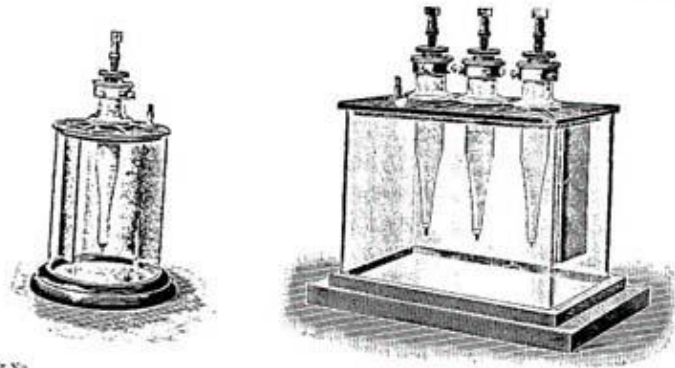
Order No.

9100	(Please state voltage for motor when ordering)	...	...	...	£10 10 0
9110	With motor wound for alternating current main	...	...	...	12 10 0

Please state voltage and periodicity. In this case, of course, the interrupter proper and coil would be worked from accumulators.

Any voltage can be passed through interrupter proper, so that if necessary the motor can run from the main and the interrupter proper (and coil) from accumulators. This is an advantage for those possessing low voltage coils working with accumulators as it saves unnecessary consumption.

Wehnelt Electrolytic Interrupters.



Order No.			
9115	Wehnelt electrolytic interrupter with 1 platinum point of 1 mm. diameter, with screw adjustment to control the length of point exposed. With two terminals for connection	...	£3 0 0
9116	Same, but with platinum point 2.5 mm. diameter	...	4 0 0
9117	Same, but with 3 platinum points, one of 1 mm. diameter and two of 2.5 mm. diameter, each with independent screw adjustment and terminal	...	9 10 0
9118	Same, but with 3 platinum points, all of 2.5 mm. diameter. This is the interrupter used for instantaneous radiography, all three anodes being then worked in "parallel"	...	10 10 0

These interrupters work with sulphuric acid. Regulation is effected by the extent of platinum point exposed, and choosing a thin point for weaker currents and a thick point for heavy currents. In all cases the coil requires to be specially made to suit them, that is to say, with a variable primary coil. They only work satisfactorily with a low voltage in the neighbourhood of about 80 volts, so that a shunt board is essential on high voltage mains. A general description of these interrupters occurs in the reading matter at the commencement of this section of catalogue.

Prices subject to fluctuation of the platinum market.
Any pattern quoted for on request, with platinum points as above or with other combinations of thin and thick. Also with Silencers, &c.

Simon Interrupter.



Order No.			
9120	Simon interrupter, single tube	...	£2 5 0
9121	" " double tube	...	2 17 6
9122	" " triple tube	...	3 14 0

Simon interrupter, regulating type, provided with a larger opening at the bottom of the tube, with a porcelain cone which can be adjusted in the aperture to reduce or increase its working section to provide regulation.

9124	Single tube	...	£4 12 6
9125	Double tube	...	5 19 6
9126	Triple tube	...	7 5 6