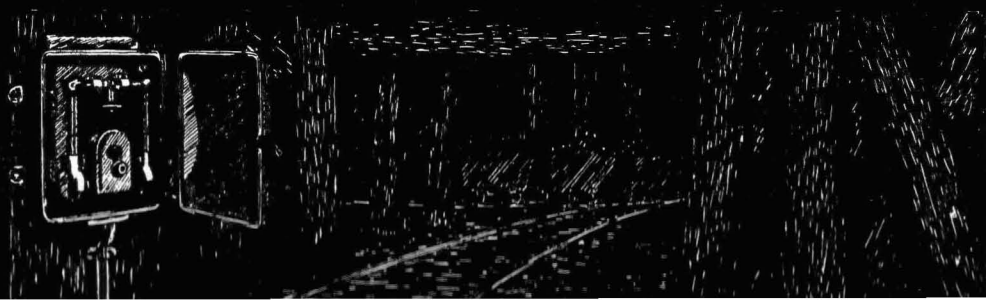




Ericsson

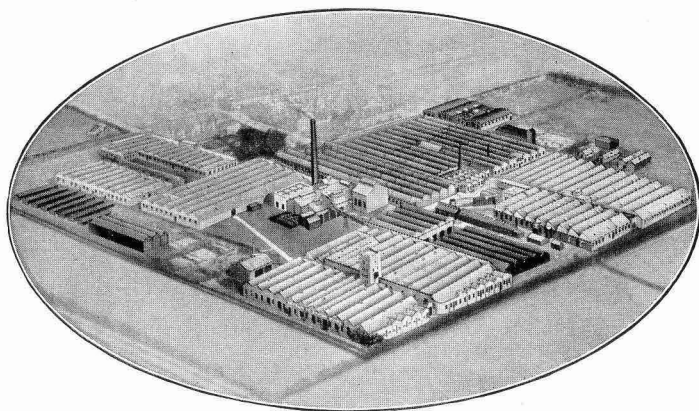
**CERTIFIED
TELEPHONE
APPARATUS
FOR MINES**



Ericsson

Certified Safe
**Telephone Apparatus
for Mines**

Manufactured at



Telephone Works, Beeston, Nottingham

CONTRACTORS TO : The British Post Office, Admiralty, War Office, Crown
Agents for the Colonies, India Office, Dominion Governments,
London County Council, and the Principal Railway
and Telephone Companies of the World.

ERICSSON TELEPHONES LTD

Head Office

22 LINCOLN'S INN FIELDS, LONDON, W.C.2

Telephones
HOLborn 6936 (5 lines)

Telegrams
ERICLOND LONDON



Why You should adopt **RELIABLE** Apparatus for Mines !

Insurance against loss of life is the primary object of the legislative acts which have made the installation of reliable and safe telephones and signals a requirement in the operation of mines.

The importance of telephone systems as essential parts of mining plants cannot be reiterated too often, not only on account of the greater safety they insure but also in the **interests of efficiency and economy.**

There are many instances where prompt communication with those on the surface has been the means of deciding the **question of life or death.** This in itself should be sufficient endorsement of the usefulness of an adequate and reliable telephone system.

Even in cases where telephones are not demanded by the mining regulations **the saving in time and money** and the **increased operating efficiency** in the working of the mines more than justifies the investment in first grade instruments and apparatus.



Why You should adopt **ERICSSON** Apparatus for Mines !

The Ericsson Company has made a prolonged study of the problems involved in designing apparatus to comply with the Mines Department regulations, has its own modern gas testing apparatus and has undertaken exhaustive research in its Laboratories in **close co-operation with the Mines Department's Testing Station.**

The certified telephones, switch-boards and signalling equipments described in this booklet are the results of considerable investigation, and have been **developed in collaboration with mining engineers** and others associated with the requirements of the mining industry throughout the country. **They are in accordance with the Mines Department Safety Pamphlet No. 8 and M.D. Circular No. 75 of February, 1935.**

It is vitally important that the number of relays, bells, or telephones bridged across a circuit should be carefully considered and when carried out in accordance with the recommendations of the Mines Department the instruments described herein may be **used with perfect safety in mines** containing the most explosive firedamp mixture.

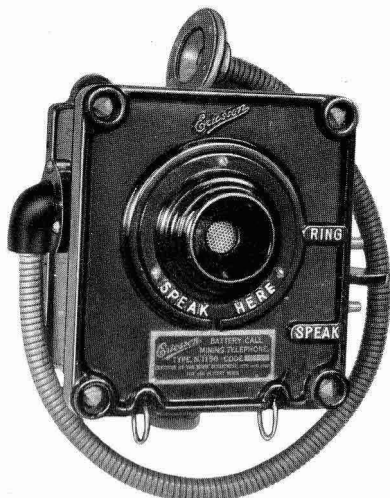
The Ericsson Magneto Mining Telephone was the first to be approved by the Mines Department as being Electrically Safe and set the standard for others.

Old type instruments may be returned to the works for modernization.

Battery Call Mining Telephone

CERTIFIED SAFE FOR MINES

Certificate T/Tel. 11 Type N1150



This instrument, certified intrinsically safe, is designed for use with a separate bell or a relay and bell, also external speaking and ringing batteries, such components to be of certified types whether used in the danger zone or not.

The cast iron case has a wide machined flange joint between the body and the front to make it flameproof and special care is taken to render it water-tight also.

The receiver, of the loud-speaking type, is fitted inside the case and has a flexible metallic listening tube with strain wire and earpiece. The transmitter is the "inset" type, waterproof and protected by a metal grid.

The induction coil, switch and connecting terminals are mounted on ebonite. The switch, which is very substantial, controls the ringing and speaking current and the connecting terminals are large and accessible.

All coils are treated to prevent the detrimental effects of moisture and gases and the connections are made with special, heavily-insulated stout wire.

Mines Dept. Type	Code No.	Dimensions, inches	Weight, lb.
N1150	N1150	9 x 9 x 6	20

A similar telephone to the above is available for railway, traction routes, etc., Code No. N1149, or with relay fitted, Code No. N1149A.

Magneto Mining Telephones

CERTIFIED SAFE FOR MINES.

Certificates T/Tel. 2C ; FLP. ²¹¹/₄₁₀ and FLP. ²¹¹/₄₁₁

**APPROVED BY THE MINES
DEPARTMENT AS BEING BOTH
INTRINSICALLY SAFE
AND FLAMEPROOF**

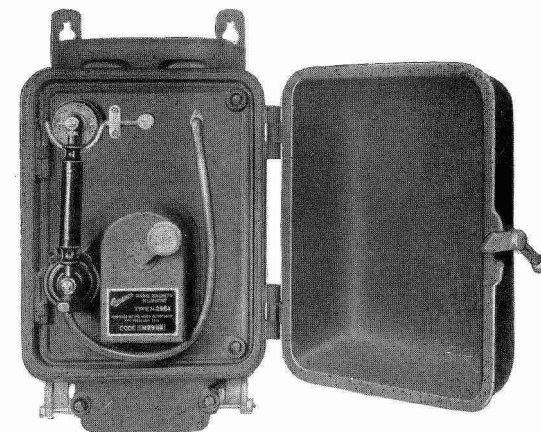
These instruments are substantially and especially designed for use in mines and have been approved by the Mines Department as being both **intrinsically safe and flameproof**. Any number may be connected in parallel, and they may be used in conjunction with the Ericsson approved switchboards, relays, indicators, bells or the special telephones for surface use under cover. When wired throughout a danger zone with armoured cable they provide full flame-proof protection even if connected to un-certified equipment outside the danger zone. They may be used on any types of line circuit provided that all other apparatus used is similarly certified safe and also that other makes of telephones are each fitted with a safety condenser.

The clean-cut outward appearance and the absence of sharp corners and projections make these instruments the ideal proposition for mining requirements.

The water-tight case is made of cast-iron or cast aluminium as indicated in the table hereafter. Two wrought iron bars are fitted to the back for fixing purposes.



Types N2974 & N2984.
Closed.

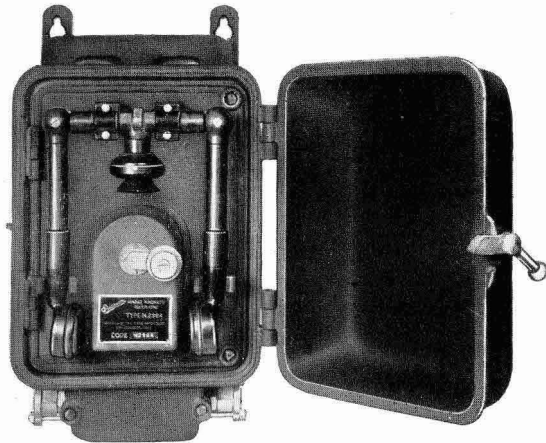


Type N2974
Open for use.

Magneto Mining Telephones—Continued

CERTIFIED SAFE FOR MINES.

Certificates T/Tel. 2C ; FLP. ~~210~~
410 and FLP. ~~211~~
411.



Type N 2984 Open for use

The outer door is fitted with a slam catch and protects the speaking equipment and generator crank from damage and dirt.

The ringer gongs are mounted on the top of the case and are protected by a cowl specially shaped so as not to deaden the sound. The hammer is operated through a greased bearing.

As it is seldom necessary to open the inner door, it is fastened by tamper-proof screws for which a suitable key is provided, thus preventing interference by unauthorised persons.

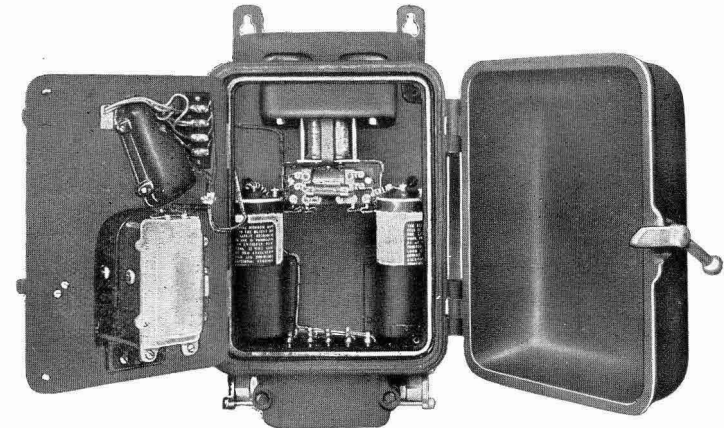
The micro-telephone on Type N2974 has a reinforced handle, inset transmitter and hygienic mouthpiece, and is firmly held on the switch hook by means of projecting pads which bear on the transmitter case, thus making the switch more positive in action.

NOTE :—Flexible Metallic Tube Arms can be provided for repairs to instruments in service having that type of arm, or if it is desired to convert these instruments the jointed arm as illustrated above can be supplied.

Magneto Mining Telephones—Continued

CERTIFIED SAFE FOR MINES.

Certificates T/Tel. 2C ; FLP. ~~210~~
410 and FLP. ~~211~~
411.



Inner Compartment.

The separate receivers and transmitter unit on Type N2984 automatically operates the switch springs when raised for use.

Flameproof enclosures are provided for the switch springs and generator cut-out.



The generator has two extra large section magnets—equal to five of the ordinary size—and the handle is strongly constructed and works through a water-tight gland.

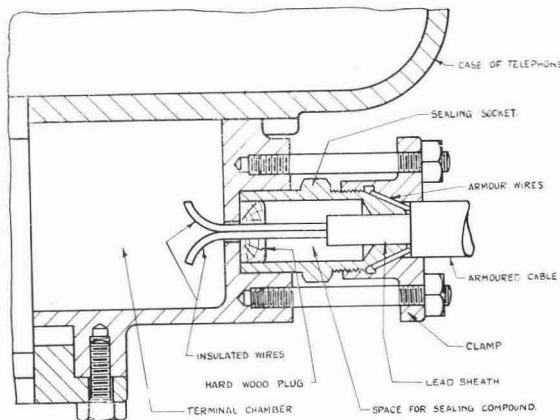
The induction coil is so arranged that it cannot be connected up wrongly, and two dry cells, Code No. N3752, are provided.

Terminals for the lines, extension bell, and also for external speaking battery if desired, are mounted in a flameproof chamber which is provided with three junctions for the entry of cables. Two sealing glands for armoured cables are fitted as standard, the third entry being covered by a cap. The combined cable-grip and sealing gland is simple and effective and may be readily understood from the sectional drawing page 8, which is self-explanatory.

Magneto Mining Telephones—Continued

CERTIFIED SAFE FOR MINES.

Certificates T/Tel. 2C ; FLP  and FLP 



Details of Combined cable-grip and sealing gland fixed to one of the entries to the terminal chamber which is fitted at the bottom of the telephone.

The casework and fittings, the apparatus, coil windings and wiring are specially treated to prevent the detrimental and corrosive effects of moisture and gases.

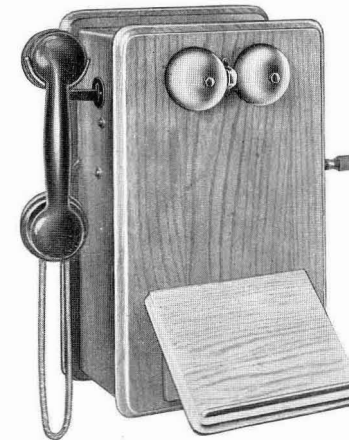
Mines Dept. Type	Code No.	Case	Dimensions inches	Weight without Battery lb.
N2974	N2974	Iron	$20\frac{3}{8} \times 12\frac{3}{8} \times 9\frac{7}{8}$	85
N2984	N2984	Iron	$20\frac{3}{8} \times 12\frac{3}{8} \times 9\frac{7}{8}$	89
N2984	N2985	Aluminium	$20\frac{3}{8} \times 12\frac{3}{8} \times 9\frac{7}{8}$	51

Note:—A similar set to N2974 is also made without the safety features, and is particularly suitable as a watertight magneto telephone for heavy parallel and long distance working, i.e., for railway or other traction routes where exposed mounting is often necessary.

Magneto Wall Telephone

Certified Safe for Mine Surface Use under Cover

Certificate T/Tel. 66.



N 2518

This instrument is designed and equipped for mine work and has been certified as intrinsically safe by the Ministry of Fuel and Power.

It may be connected with the underground circuits but it is intended solely for use on the surface under cover, as in the Winding House, at the Bank, or in offices where an ironclad telephone would be out of place. It is not suitable for use below ground or in exposed positions.

The woodwork is matt polished and the metal fittings are finished black and copper bronze.

All terminals are enclosed and the battery compartment will accommodate two large dry cells.

In common with other certified apparatus, the connection and use of this telephone is governed by the Telephone and Signalling Orders, therefore, when used for parallel working with other makes, the latter must be certified.

Ministry of Fuel and Power Type	Code No	Dimensions, inches	Weight, lb.
N 2518	N 2518	$15\frac{1}{4} \times 8\frac{3}{4} \times 8\frac{3}{8}$	$9\frac{1}{2}$



Magneto Table Telephone

Certified Safe for Mine Surface Use under Cover

Certificate T/Tel. 82.



N 2121Z

In the executive office, etc., on the mine surface it is often more convenient to have an instrument on the desk, than one fixed to a wall. For this purpose the table telephone illustrated has been approved as intrinsically safe by the Ministry of Fuel and Power, and may therefore be connected with the underground circuits.

The moulded bakelite casing is of neat yet robust construction and the interior components, including the bell and generator, are mounted on a removable metal baseplate.

The modern shockproof bakelite micro-telephone with inset transmitter and detachable receiver, is noted for excellence of transmission and reception.

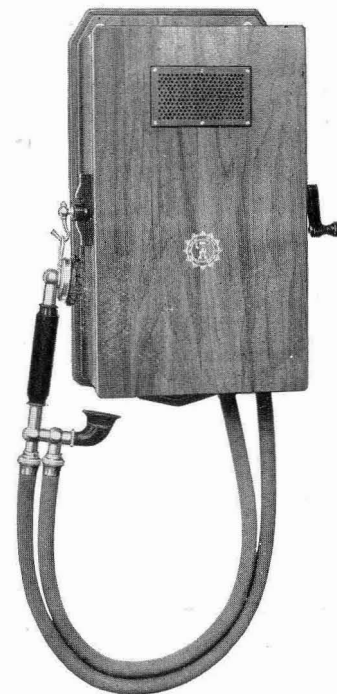
The set is intended solely for use on the surface under cover.

Ministry of Fuel and Power Type	Code No.	Dimensions, inches	Weight, lb.
N 2121	N 2121Z	$9\frac{1}{4} \times 7\frac{1}{4} \times 6\frac{3}{4}$	$7\frac{1}{2}$



Magneto Wall Telephone

"High Tension"



N 2950

This set is specially designed for use where the telephone lines are run on the poles which carry high-tension power transmission lines, or where there is any risk of contact between these two circuits.

The case is of polished hardwood, lined with tinned steel plates which are connected to the earth terminal.

The micro-telephone is a dummy acoustically connected, by means of two special vulcanized rubber tubes, 39 inches long, to the transmitter and receiver which are fitted inside the case.

The generator has five magnets, and the resistance of the ringer is 2,000 ohms. The generator crank and the switch arm are made of solid ebonite of massive proportions, and all external parts liable to be touched are efficiently insulated from the internal fittings and wiring.

A special protector, consisting of carbon arresters and heat coils is fitted internally, and ample space is provided for two large size dry cells.

It is vitally important that these telephones should be fully protected in order to ensure safety to the user and also to the apparatus.



Magneto Wall Telephone

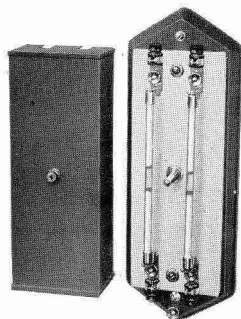
"High Tension"—continued.

In addition, to the special protection arranged inside the instrument, the protector and discharge coil illustrated and described below are provided.

Protector

This protector consists of two extra long fuses mounted on a marble base and provided with an enamelled metal cover which is connected to an earth terminal.

The protector should be fitted near to the point where the telephone lines enter the building, and the earth terminal should be efficiently connected to a good earth.

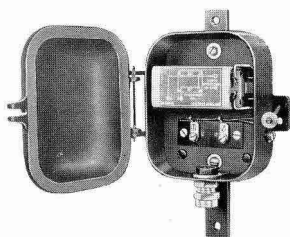


N6505

Discharge Coil

When telephone lines are run on the same poles as high tension conductors, the disturbances—due to the proximity of the high-tension circuit—can be reduced by the use of discharge coils.

These coils should be fitted at the terminal stations.



N8529

Code No.	Apparatus	Dimensions, inches	Weight lb.
N2950	Telephone	$21\frac{1}{2} \times 11\frac{1}{4} \times 7\frac{1}{2}$	39
N6505	Protector	$16 \times 5\frac{3}{4} \times 4\frac{1}{4}$	$7\frac{3}{4}$
N4600	Spare Fuse	$9 \times \frac{1}{2}$	—
N8529	Discharge Coil	$9 \times 6\frac{1}{8} \times 3$	$8\frac{1}{4}$

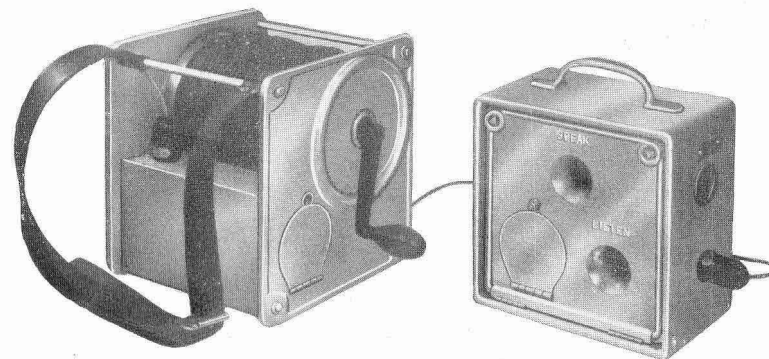
NOTE.—The instrument on the previous page and the above protective apparatus are for use on medium high-voltage routes and telephone lines up to about 30 miles long. For the higher voltage routes with complicated networks we supply specially constructed apparatus, including isolating switches, horn-gap and rare-gas arresters and transformers which completely divide the telephones from the lines. Particulars on application.



Mines Rescue Apparatus

CERTIFIED SAFE FOR MINES

Certificate T/Tel. **78**



N 20653

N 20649

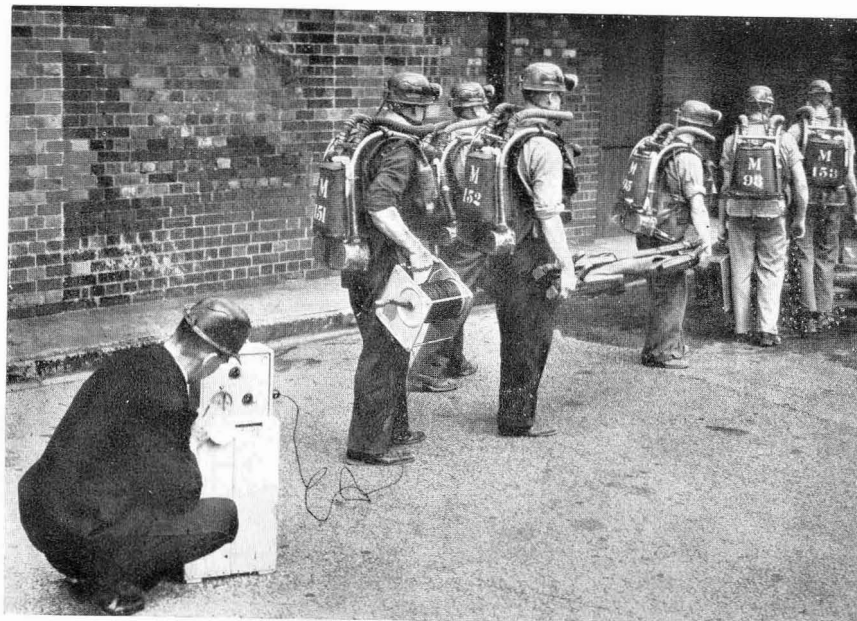
This apparatus has been specially designed in collaboration with the Mines Department and Rescue Station Superintendents, so that when an accident occurs in a mine the rescue party shall be provided with a safe and reliable system of communication.

The Base Station Unit N.20649 comprises an aluminium-silicon case $11'' \times 10\frac{1}{4}'' \times 6\frac{1}{2}''$ containing a transmitter, a loud speaking receiver, a buzzer, a speaking key, a ringing key, a plug socket and under the flap on the left a buzzer test key and adjustment screw.

The Advance Station Unit N.20653 is also constructed of aluminium-silicon and is similarly equipped, but in addition a special cable reel is incorporated for paying-out the line wires as the rescue party advances. A transmitter is not fitted in this unit as speech is not practicable since respirators are usually worn by the rescue party. The cable reel holds approximately 280 yards of a specially strong constructed cable. The dimensions of the unit are $11'' \times 11'' \times 11''$.

Full communication is maintained uninterrupted during paying out and reeling in of the cable.

Mines Rescue Apparatus Contd.



If during rescue operations it is desired to extend beyond the cable length, a further advance party instrument can be connected by a simple plug and the circuit transferred from the first to the second unit.

The facilities for communication are as follows :-

The base party can speak or code signal by buzzer and key to the advance party.

The advance party can receive speech and code signals and communicate to the base party by code signals.

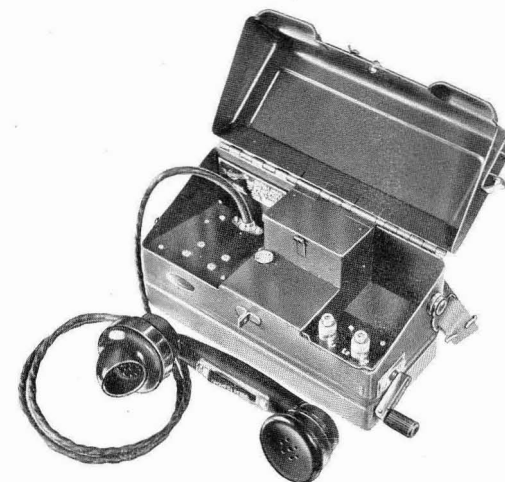
The weight of N.20649 is 15 lb. approximately.

The weight of N.20653 with 280 yards of cable is 25 lb. approximately.

Portable Telephone

CERTIFIED SAFE FOR MINES

Certificate T/Tel. 80.



N 1846

This compact instrument is primarily designed for testing purposes but can also be used as a temporary station.

It has been approved as intrinsically safe by the Ministry of Fuel and Power and is suitable for surface or underground use.

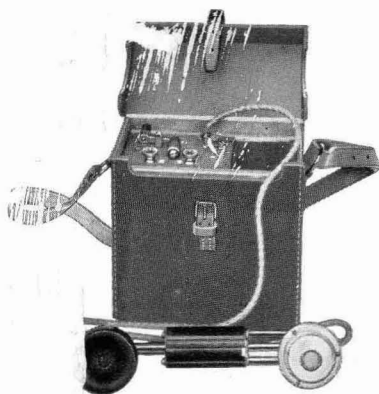
The instrument is carried by means of a strong woven-fabric shoulder strap, and is well protected by the weatherproof metal casing, so that it is eminently suitable for heavy service.

The generator handle is normally stowed vertically between the projections seen on the right-hand side of the lid in the illustration and for use is turned down at right-angles and held rigid in either position by a spring-loaded slide provided on the crank.

Components include an anti-side-tone induction coil, ringer, condensers, an alnico generator with anti-spark winding, and a modern shockproof bakelite micro-telephone with press key. The compartment for the microphone battery of two dry or inert cells can be seen, with lid closed, in the back centre of the illustration.

Ministry of Fuel and Power Type	Code No	Dimensions, inches	Weight, lb.
N 1846	N 1846	11 $\frac{1}{8}$ x 5 $\frac{1}{2}$ x 5	9 $\frac{3}{4}$

Portable Telephones



N1830A



N1853

These portable telephones are primarily designed for testing purposes but are also useful as temporary stations on surface circuits or in non-flammable mines. They are not suitable for connecting to circuits in mines where there is risk of explosions.

N1830A comprises a strong leather outer case with strap for carrying purposes; an inner hardwood case containing a 3-magnet generator, 500-ohm ringer, induction coil and battery, and having a compartment for the telescopic micro-telephone.

N1853 is a more powerful set, in a substantial, polished hardwood case, containing a 5 magnet generator, 2,000-ohm ringer, induction coil, 2 dry cells and a micro-telephone.

Code No.	Dimensions inches	Weight, lb.
N1830A	$7\frac{1}{2} \times 7\frac{1}{2} \times 4$	9
N1853	$8\frac{1}{4} \times 12 \times 6\frac{3}{4}$	19

Magneto Mining Switchboards

The most useful, efficient and reliable system is that which employs a switchboard from which the lines branch to the different sections of the mine. It provides greater facilities in handling calls, and has a number of other advantages, an important one being that a fault on one section or line does not affect the rest of the system.

In designing these switchboards, special consideration was given to the severe conditions under which this class of instrument is required to operate, and more especially with regard to the liability of being subject to rough handling by careless workmen.

The method of making the connections is very simple, and as fragile cords, plugs and jacks are eliminated, the maintenance costs will obviously be a minimum.

The connections are made by means of push-and-pull type keys, and the circuit is designed to provide a very flexible system whereby a variety of connections can be made by simply pushing in the required key or keys. Some of the facilities are as follows :—

- Communication can be established between the controlling telephone incorporated or fitted alongside the switchboard, and any section.
- Each section can be put into communication with any other section.
- Two or more sections can be connected in bridge with the controlling telephone, and should any section so connected become faulty it can be rapidly isolated, thus maintaining the rest of the system in working order.

These and many other features are invaluable, especially in an emergency.

The switchboards are arranged for metallic line working and two or three telephones may be bridged across the pair of wires run to each section of the mine, signalling being done by code. It is, however, very important that the number of telephones in bridge should be small, as each telephone added reduces the margin of safety. Hence the great advantage of having a switchboard as a means of distributing the lines on a safer basis.

A controlling telephone such as N2974 or N2984 is required for N 510 type for operating purposes and should be fitted alongside the switchboard.

Cordless Magneto Mining Switchboards

Wood Case.

CERTIFIED SAFE FOR MINES.

Certificate T/Tel. 2F.



Type N510

This type of switchboard has been specially designed to meet the demand for a cheaper article for mines where cast-iron explosion-proof cases are not essential.

The casework is constructed of hardwood of robust proportions, and the sloping top is reinforced by a heavy-gauge steel plate, which provides ample protection against falling roof material and water. A special triangle-headed screw lock is fitted, and a suitable key for same is supplied.

The indicators, mounted on the steel front plate, are protected by a watertight cover, and are re-set by turning the knob at the right-hand side.

The connecting keys, comprised of stout metal plungers fitted with metal tops, will withstand a considerable amount of rough usage. The tops are engraved to indicate the connections made when the keys are depressed.

The terminals are mounted on ebonite strips screwed to the backboard and are very accessible. A blind back is fitted to protect the interior from dust, moisture and unauthorised interference.

This form of cordless switchboard is widely known as the "Pyramid," on account of the design formed by the keys. The simplicity of operating and obvious low maintenance costs have made them the general favourites for small magneto systems.

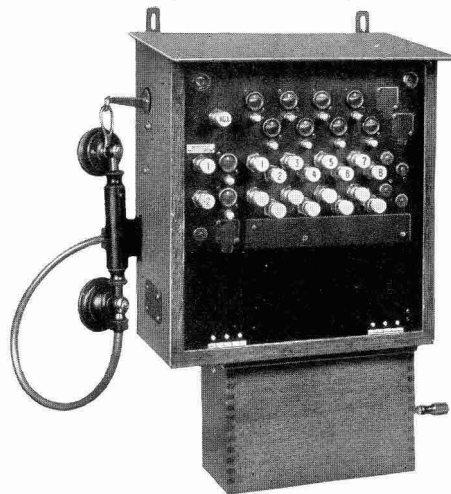
For connecting of armoured cables, see page 17.

Mines Dept. Type	Code No.	No. of lines	Dimensions, inches	Weight, lb.
N510	N509	3	11 × 9 × 8 $\frac{1}{2}$	15
N510	N510	4	11 × 9 × 8 $\frac{1}{2}$	16
N510	N512	6	13 $\frac{1}{4}$ × 11 $\frac{1}{4}$ × 8 $\frac{1}{2}$	23

Cordless Battery and Magneto Mining Switchboards

CERTIFIED SAFE FOR MINES.

Certificates T/Tel. 18 and T/Tel. 2F.



Type N550 Enclosed Indicators.

This design of switchboard can be supplied for either battery or magneto working. It differs from the previous illustration in that the line and clearing indicators are totally enclosed, and the signal discs are re-set by push-keys individual to each indicator.

The appearance of the battery switchboard, Type N530, is similar to the magneto ones, Type N550, which is illustrated, but there is no generator-in-case fitted. These switchboards may be used with any make of certified safe telephones, the magneto types being also fitted with telephone safety condensers.

When required for floor mounting a suitable stand can be supplied.

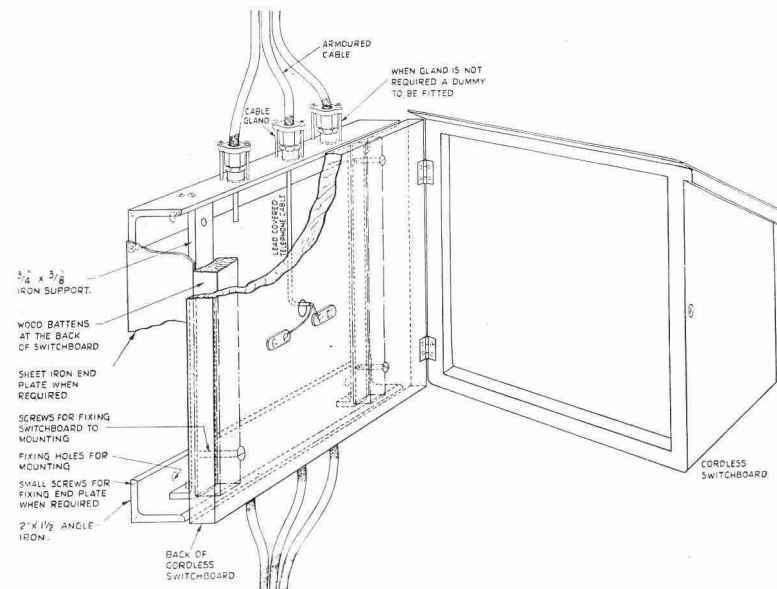
BATTERY CALL		MAGNETO CALL		No. of Lines	No. of Connecting Circuits
Mines Dept. Type	Code No	Mines Dept. Type	Code No.		
N530	N530	N550	N550A	10	3
N530	N531	N550	N551A	15	4
N530	N532	N550	N552A	20	4
N530	N533	N550	N553A	25	5
N530	N534	N550	N554A	30	5

Note :—The drop type indicator can still be supplied for additions and extensions to existing switchboards having this type of indicator.

Cordless Mining Switchboards

CERTIFIED SAFE FOR MINES

Certificate T/Tel. 2F.



This illustrates the method of terminating armoured cables. The iron framework is made suitable for the size of switchboard in use, and the cable glands can be arranged at the top and bottom as shown or at both sides if required.

Cord Mining Switchboard

CERTIFIED SAFE FOR MINES.

Certificate T/Tel. 2F.

Mines Department Type N570.

Where more than 30 lines are required we make a floor pattern switchboard, which accommodates any equipment up to 100 lines.

The line indicators are totally enclosed, and plug restored ; the clearing indicators are totally enclosed, and push-key restored ; and the connections are made by means of plugs, cords and keys.

Armoured Cable Glands and Terminating Boxes

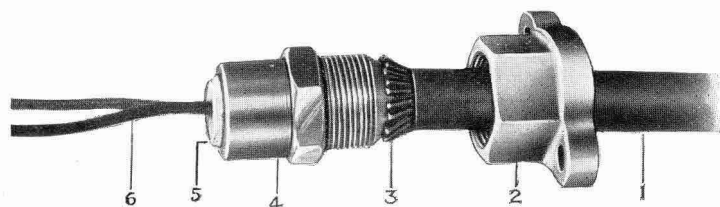


Fig. 1. Method of attaching cable to gland.

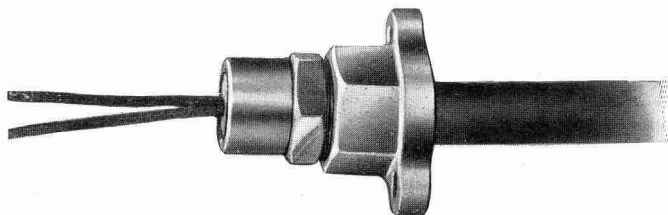


Fig. 2. Armoured cable and sealing gland ready for connecting to terminal chamber.

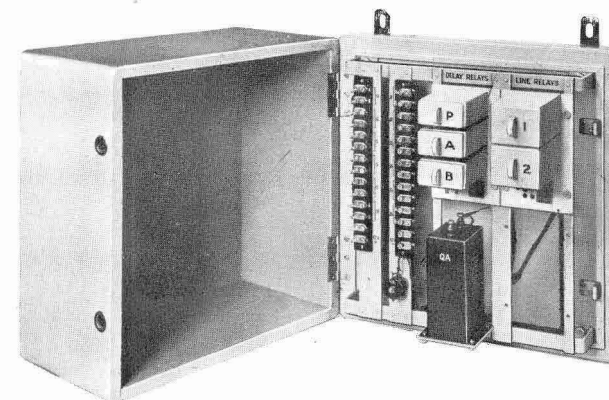
In the upper illustration, (1) the armoured cable is passed through (2) the clamp, and the armour wires (3) are cut back to within $\frac{3}{8}$ inch from the outer covering and splayed to fit the cone end of the sealing chamber (4). One inch of lead covering is left on the conductors and passes into the sealing chamber, which is then screwed tightly into the clamp, as in the lower illustration. The sealing chamber (4) is then filled with a suitable compound, so that when the wood plug (5) is inserted, it projects slightly, as in Fig. 1. When the gland is finally clamped to the terminal chamber (see page 8) the wood plug is forced flush with (4), as in Fig. 2 and completes the sealing.

Particulars of suitable Junction, Joint and Terminal Boxes will be given on application.

Code Ringing Delay Unit

CERTIFIED SAFE FOR MINES

Certificate T/Tel. 48.



N 8656

This unit has been specially designed to provide code ringing between stations on a line connected to a switchboard and is so arranged that the indicator on the switchboard is not actuated unless the exchange operator's attention is required.

This is most useful on the lines along the haulage roads and ensures that an emergency call to the switchboard operator gets prompt attention.

One delay unit will cope with two or more lines depending upon the code ringing and the frequency of calls. A maximum of six lines can under certain conditions be accommodated, but all particulars of requirements should be stated.

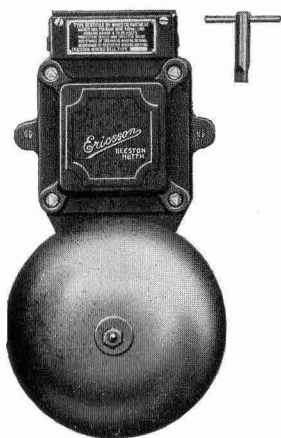
Overall Dimensions $17\frac{1}{2} \times 16 \times 10$ inches.

Mines Dept. Type	Code No.	Lines	For Magneto Switchboards Code No.
N.8656	N.8656	2	N.550A
N.8656	N.8656A	4	N.551A & N.552A
N.8656	N.8656B	6	N.553A & N.554A



Battery Mining Bells

CERTIFIED SAFE FOR MINES



Type N3030

Certificate T/BR 63.

Intrinsically safe mining bell, type approved by the Mines Department for use in fiery mines with bare wire or open switch signalling up to the maximum pressure of 25 volts, and for any number in parallel, using porous pot Leclanché cells not larger than 3-pint size, or other certified source of current as advised in the Mines Department Circular No. 69 of 14th June, 1934.

The base and cover are made of fine quality cast iron, and have wide machined flanges which give ample cooling surfaces. The cover is fixed by means of special triangle-headed screws sunk into the casting to prevent removal, except by a special key. The terminals are housed in a separate compartment fitted with a drip-proof cover. The frame is arranged to take either a 6-inch or 8-inch gong. The hammer operates on the underside of the gong, and is protected from malicious interference.

The coils are treated to prevent the detrimental and corrosive effects of moisture, and provision is made for testing the anti-spark windings which are 80 and 100 ohms respectively, for the 20 and 30-ohm bells.

The 20-ohm bells operate on 12 volts through 30 ohms, i.e., two miles of No. 8 G.I. wire; the 30-ohm bells operate on 12 volts through 45 ohms, i.e., three miles of No. 8 G.I. wire and either type operates on four volts direct, and may be used as single stroke or trembling.

Mines Type Dept.	Code No.	Gong, inches	Resistance Ohms	Suitable for Voltages	Dimensions, inches	Weight, lb.
N3030	N3030D	6 brass	20	4 to 12	$13\frac{1}{2} \times 7\frac{1}{2} \times 3\frac{3}{8}$	$10\frac{1}{2}$
"	N3030E	6 brass	30	4 to 25	$13\frac{1}{2} \times 7\frac{1}{2} \times 3\frac{3}{8}$	$10\frac{1}{2}$
"	N3031D	6 iron	20	4 to 12	$13\frac{1}{2} \times 7\frac{1}{2} \times 3\frac{3}{8}$	$11\frac{3}{4}$
"	N3031E	6 iron	30	4 to 25	$13\frac{1}{2} \times 7\frac{1}{2} \times 3\frac{3}{8}$	$11\frac{3}{4}$
"	N3032D	8 iron	20	4 to 12	$15\frac{1}{2} \times 8 \times 3\frac{3}{8}$	$13\frac{3}{8}$
"	N3032E	8 iron	30	4 to 25	$15\frac{1}{2} \times 8 \times 3\frac{3}{8}$	$13\frac{3}{8}$
"	N3033	6 bell metal	20	4 to 12	$13\frac{1}{2} \times 7\frac{1}{2} \times 3\frac{3}{8}$	$11\frac{1}{2}$
"	N3033A	6 bell metal	30	4 to 25	$13\frac{1}{2} \times 7\frac{1}{2} \times 3\frac{3}{8}$	$11\frac{1}{2}$
"	N3034	8 bell metal	20	4 to 12	$15\frac{1}{2} \times 8 \times 3\frac{3}{8}$	$12\frac{3}{4}$
"	N3034A	8 bell metal	30	4 to 25	$15\frac{1}{2} \times 8 \times 3\frac{3}{8}$	$12\frac{3}{4}$

Watertight Bells

This bell is of exactly the same design, construction and finish as the mining type on the previous page, but is not fitted with the special anti-spark device and hence is slightly more sensitive.

For use above ground, at the bank, in the winding house or any exposed positions, also it may be used in mines where there is no possibility of risk due to the presence of explosive gases.

The resistance of the coil windings is 12 ohms and the bell will operate on four volts direct up to 12 volts through 20 ohms.



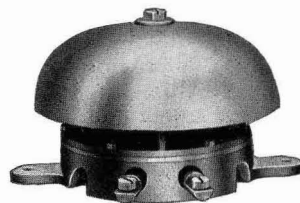
N3038A

Code No.	Gong, inches	Dimensions, inches	Weight, lb.
N3036A	6 brass	$13\frac{1}{2} \times 7\frac{1}{2} \times 3$	$10\frac{1}{2}$
N3037A	6 iron	$13\frac{1}{2} \times 7\frac{1}{2} \times 3$	$11\frac{1}{4}$
N3038A	8 iron	$15\frac{1}{2} \times 8 \times 3$	$13\frac{1}{4}$
N3039	6 bell metal	$13\frac{1}{2} \times 7\frac{1}{2} \times 3$	$11\frac{1}{2}$
N3040	8 bell metal	$15\frac{1}{2} \times 8 \times 3$	$12\frac{3}{4}$

An exceptionally compact, gas and water-tight bell suitable for damp and dusty positions, engine rooms, huts, offices, etc.

The case is cast in solid brass and the gong, in bell-metal, is five inches in diameter.

The movement is of unique construction and proved reliability and operates on 6 to 24 volts without re-adjustment.



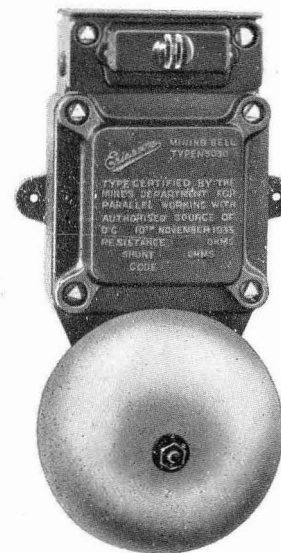
N3027

Code No.	Resistance, Ohms	Dimensions, inches	Weight, lb.
N3027	25	$5\frac{1}{2} \times 6 \times 3\frac{1}{2}$	$3\frac{1}{2}$

Battery Mining Bell with Lamp Signal

CERTIFIED SAFE FOR MINES

Certificate T/BR 63. (add.)
and Lights Approval No. 13/10.



There are many instances where it is necessary to have two or more bells fitted close together, so that, difficulty is sometimes experienced in distinguishing which bell is rung, even when different toned gongs are employed. Rapid and positive identification is assured, however, by means of a visual signal, preferably incorporated in the bell, and readily attached thereto as in the illustrations here.

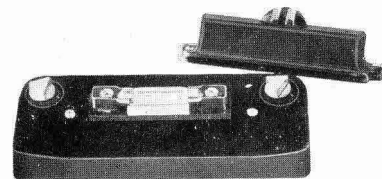
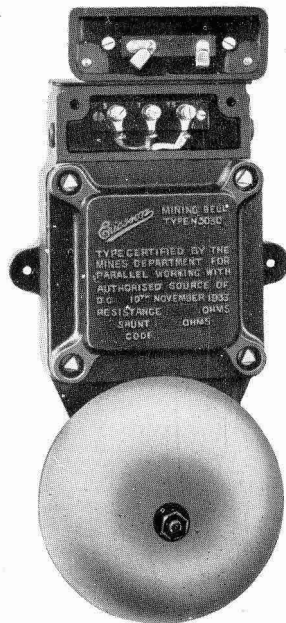
This bell is exactly the same as the well known Ericsson Battery Mining Bell except that the standard terminal cover is replaced by one containing a lamp. It will therefore be appreciated that by this neat design and arrangement a visual signal can be readily fixed to an existing Ericsson bell, without even removing the bell from its position.

Ericsson

Battery Mining Bell with Lamp Signal Contd.

CERTIFIED SAFE FOR MINES

Certificate T/BR 63. (add.)
and Lights Approval No. 13/10.



The festoon type lamp fits into clips attached to the terminal cover and is protected by a strong casting with a robust grille guard which also houses a powerful lens.

The guard is fixed to the terminal cover by means of captive screws from the inside, so that the lamp cannot be exposed until the terminal cover is first removed.

The method by which the lamp is automatically connected up by simply fixing the terminal cover in position is illustrated at the top of the bell on this page where a reverse of the terminal cover shows the springs which make contact with the bell terminals. Moreover, the left-hand spring can be adjusted to contact with either the left-hand or centre terminal, for single stroke or trembler working.

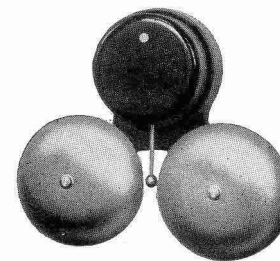
The bright green light from the lens is very effective and immediately arrests the attention.

Terminal cover with 6 volt lamp N 55818
Terminal cover with 12 volt lamp N 55819

Ericsson

Magneto Mining Bell **CERTIFIED SAFE FOR MINES**

Certificate T/Tel. 2G



Type N3109

The ordinary telephone ringer is sometimes inadequate owing to the position in which the instrument is necessarily fitted or to excessive local noises.

In such cases this loud-ringing magneto bell is extensively used, to supplement the instrument bell, as it is capable of being heard at a considerable distance.

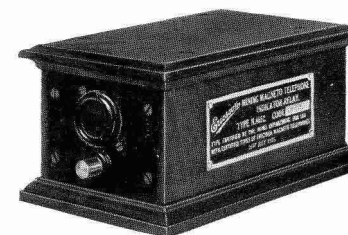
The movement with safety condenser is enclosed in an all-metal and weather-proof case, the coils are moisture-proofed and all parts are given a protective finish.

Mines Dept. Type	Code No.	Gongs, inches	Resistance, Ohms	Dimensions, inches	Weight, lb.
N3109D	N3109D	6 brass	2000	11 × 13 × 3 1/2	9 1/2
"	N3109E	6 iron	2000	12 × 12 7/8 × 3 1/2	12
"	N3109F	8 iron	2000	13 × 16 5/8 × 3 1/2	16

Indicator-Relay

**CERTIFIED
SAFE FOR MINES**

Certificate T/Tel. 2F.



Type N8652

This instrument as the name implies can be used for two purposes. It will indicate when a call has been made during the absence of the attendant and also act as a relay and close a local circuit for a loud-ringing extension bell. The bell continues to ring until the shutter is replaced.

It consists of a push-key restored enclosed indicator in a polished hardwood case with four connecting terminals mounted inside the case.

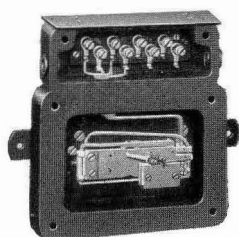
For use with certified telephones and bells.

Mines Dept. Type	Code No.	Resistance, Ohms	Dimensions, inches	Weight, oz.
N8652	N8652	1000	2 3/4 × 3 3/8 × 5 7/8	20

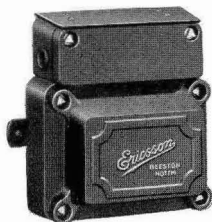
Relays

CERTIFIED SAFE FOR MINES

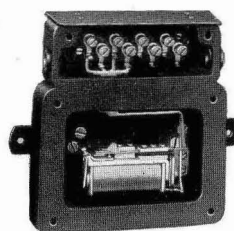
Certificates T/Tel. 12 and T/BR.55



Type N7236



Types N7236 or N7240



Type N7240

The case is of cast-iron with a wide machined flange joint between the base and cover and a packing washer to make the joint water-tight. The cover is fixed by special triangle-headed screws sunk into the casting to prevent removal except by a special key.

The movement is robust, reliable and very sensitive to weak currents and the terminals are mounted on ebonite in a separate compartment fitted with a drip-proof cover.

Type N7236 operates from magneto telephone current and remains operated so long as the generator handle is being turned ; after which it automatically restores to normal.

Type N7240 operates from direct current up to a pressure of 25 volts from a source of current certified by the Mines Department.

These relays may be operated singly or any number in parallel.

Mines Dept. Type	Code No.	Resistance Ohms	Make Contacts	Dimensions, inches	Weight, lb.
N7236	N7236A1	1660+(10,000)	1	$7\frac{5}{8} \times 8\frac{1}{2} \times 3\frac{1}{4}$	$11\frac{1}{4}$
"	N7236A2	"	2	"	$11\frac{1}{4}$
"	N7236A3	"	3	"	$11\frac{1}{4}$
N7240	N7240A1	250+(500)	1	"	11
"	N7240A2	"	2	"	11
"	N7240A3	"	3	"	11

Receivers

These receivers may also be used as transmitters and are therefore handy to carry in the pocket for testing and for tapping the circuits in case of emergency, etc.



N6804

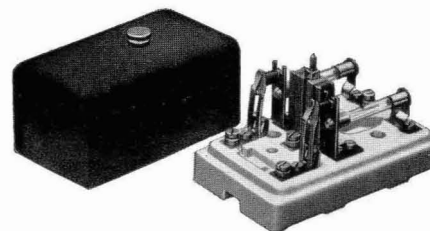


N6812A

Code No.	Resistance, Ohms	Dimensions, inches	Weight, oz.
N6804	120	$2\frac{3}{8} \times 2\frac{3}{4}$	9
N6812A	120	$3\frac{1}{4} \times 2\frac{1}{2} \times 1\frac{1}{4}$	4

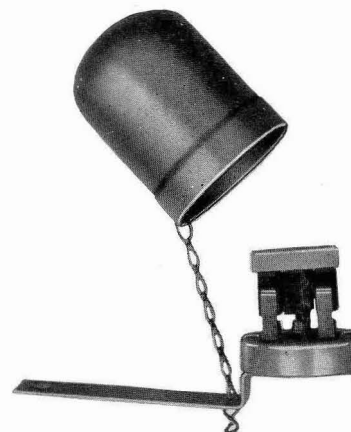
Protectors

This protector provides protection against lightning, abnormal currents and leakage or sneak currents and should be fitted in each telephone line above ground.



N6543

Code No.	Dimensions, inches	Weight, oz.
N6543	$4\frac{9}{16} \times 2\frac{3}{4} \times 3$	18



N6541

Suitable for mounting outside on poles, etc., this lightning arrester comprises a porcelain base with carbons so arranged that they are self-clearing after a discharge.

The galvanised iron cover is anchored to the fixing bracket by a chain.

Code No.	Dimensions, inches	Weight.
N6541	$8 \times 4\frac{7}{8} \times 3\frac{3}{4}$	3 lb. 5 oz.



Spares for Mining Apparatus

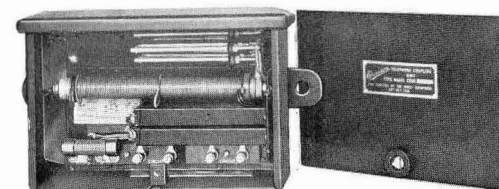
Code No.	Description and for Mines Dept. Type No.
For Mining Telephones	
N8680	Receiving tube with earpiece, for N1150.
N7744	Inset transmitter, for N1150.
N3510	Induction coil, for N1150, N2974 and N2984.
N5829	Micro-telephone, for N2974.
N19788	Hook, Micro-telephone, for N2974.
N3007	Receiver Arm without transmitter, for N2984.
N3007A	Receiver Arm with transmitter, for N2984.
HNZ.15	Generator Handle, for N2974 and N2984.
N4652	Generator complete, for N2974 and N2984.
N6823	Receivers, for N2984.
N7703	Transmitter complete, for N2984.
N7742E	Inset only, for N2984.
N7307	Ringer less gongs, for N2974 and N2984.
N11236	Gongs, for N2974 and N2984.
N11233	Cover for gongs, for N2974 and N2984.
N19769	Terminal box, for N2974 and N2984.
N19770	Cover for terminal box, for N2974 and N2984.
N3752	Dry Cells, for N2974 and N2984.
For Mining Switchboards.	
N4810B	Drop indicator, for N510 and N550.
N4781Q	Enclosed indicator, for N530.
N4781N	Enclosed indicator, for N550.
N5202A	Key, connecting, for N510 and N550.
N5214A	Key, connecting, for N530.
N5204A	Key, Ringing, for N530.
N10517	Indicator cover complete, for N510.
For Mining Bells.	
N11920	Gong 6" brass, for N3030.
N11902	Gong 6" iron, for N3030.
N16940	Gong 6" bell-metal, for N3030.
N11914	Gong 8" iron, for N3030.
N17127	Gong 8" bell-metal, for N3030.
N11240	Gong 5" bell-metal, for N3027.
N11241	Gong 6" brass, for N3109
DMA.48	Gong 6" iron, for N3109
DMA.46	Gong 8" iron, for N3109
N12565	Key, for telephones, switchboards, bells and relays.



Mining Telephone Coupling Unit

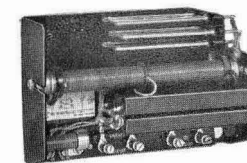
CERTIFIED SAFE FOR MINES

Certificate T/Tel. 41.



With case, cover off.

N 8655C



Without case.

N 8654B

This patented Telephone Coupling Unit permits connections to be made between any certified magneto telephone system and an uncertified one.

It consists of an arrangement of Westinghouse metal rectifiers, condensers and impedances, which when connected in a line circuit has little or no effect on the speech currents and absorbs the correct amount of ringing energy to render the circuit safe.

One unit per unsafe telephone line connected to a certified telephone or switchboard, and one unit per junction line between an uncertified surface switchboard, and a certified switchboard, should be fitted.

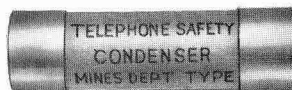
The Coupling Unit is housed in a strong iron case, which is rust-proofed and heavily enamelled or can be supplied without case if desired, as illustrated.

Mines Dept. Type	Code No.	Description	Dimensions, inches	Weight lb.
N.8655	N.8654B	without case	5 $\frac{1}{2}$ x 8 $\frac{1}{2}$ x 3	3 $\frac{3}{4}$
N.8655	N.8655C	with case	6 $\frac{1}{2}$ x 11 $\frac{1}{2}$ x 3 $\frac{3}{4}$	8 $\frac{3}{4}$
N.8655	N.8655D	with case & gland	9 x 11 $\frac{1}{2}$ x 3 $\frac{3}{4}$	11 $\frac{1}{2}$



Telephone Safety Condensers

MINES DEPARTMENT TYPE.

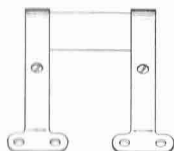


N3673

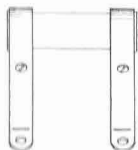
This condenser has been specially designed so that certified magneto telephones and bells of different makes may be used on the same system, and in accordance with the Mines Department Circular No. 75 of February 1935.

N3673 is the code of the condenser without fixing clips.

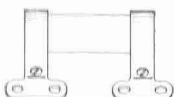
Condensers with clips for use on Ericsson magneto apparatus are shown below.



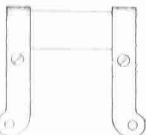
N3673A Telephone Safety Condenser
for use on Telephones N2974, N2984 & N2985.



N3673B Telephone Safety Condenser
for use on Telephones N2972, N2982 & N2983.



N3673C Telephone Safety Condenser
for use on Telephones N2504A & N2155B.



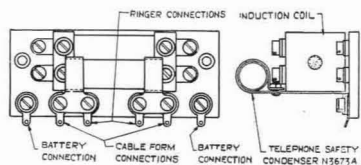
N3673D Telephone Safety Condenser
for use on Magneto Bells N3109D, N3109E & N3109F.



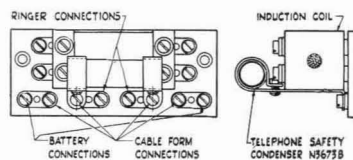
N3673E Telephone Safety Condenser
for use on Telephone N2961 which is first converted to render it intrinsically safe,



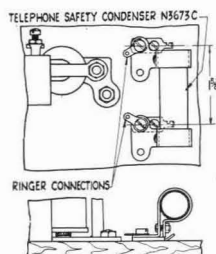
Telephone Safety Condensers POSITION OF FIXINGS



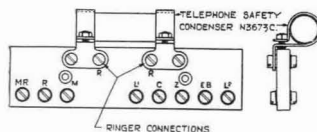
Safety Condenser fixed on
N2974, N2984 & N2985.



Safety Condenser fixed on
N2972, N2982 & N2983.



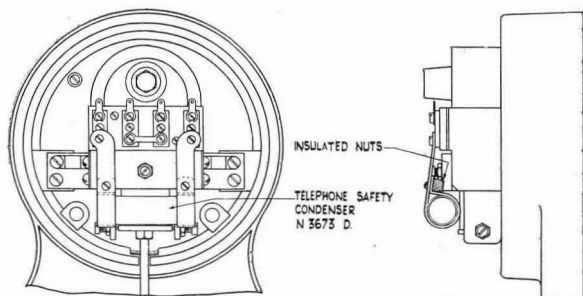
Safety Condenser
fixed on
N2504A.



Safety Condenser fixed on
N2155B.



Safety Condenser fixed on
N2961.



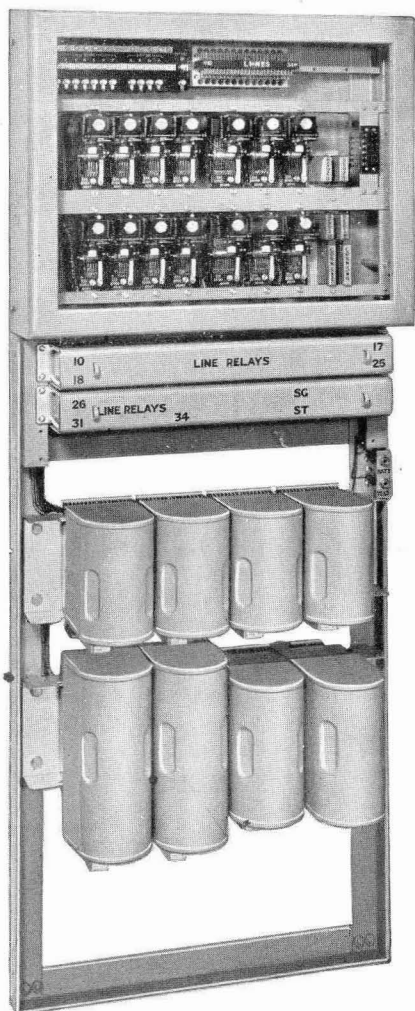
Safety Condenser fixed on N3109D, N3109E & N3109F.



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