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Editorial

AN inherent drawback of most study tours is the almost inevitable lack of time in which to *study* any detail closely and the recent visit to American hospitals was no exception. Nevertheless, much was seen and, comparing the comparable facets, this will give much food for thought. Allowing, then, for such factors as a relative absence of regional planning, due partly to the size of the country, partly to the voluntary system amongst the majority of general hospitals while the mental hospitals are the responsibility of states, and the various factors for which the American way of life is the underlying force, a number of post-war developments have taken place of which some, such as central sterile services and post-operative recovery wards, are already finding favour over here. In spite of the fact that it is customary to employ bigger staffs in American hospitals than would be permitted here or on the continent, a major contributory cause to the greater efficiency to be found in the newer and larger hospitals lies undoubtedly in the development of the central supplies theme. This requirement, wherever it can be applied, is kept very much to the fore in the design of new hospitals and has considerable influence upon the evolution of the " racetrack " ward plan in which the core is the receiving point for the bulk of supplies of all kinds.

In regard to the average standard of patient care there has not been very much said. It seems that, while the larger hospitals are better than anything that we have here, there are a remarkable number of poor ones. This may be less surprising when it is realised that the average sized hospital is rather smaller than we would consider desirable and very many are very small indeed, but America is a large country with wide population variations and there are almost 7,000 hospitals.

Other aspects can be mentioned. For instance, the two and four bed ward predominates in most hospitals. This has been debated in this country and, because of increased staff demands, has not found much support. It is the general opinion that the catering is much better than here and that there is greater variety. It is difficult to say how much of the differences seen is due to patient demand and how much is the result of more and better equipment throughout departments, but of the latter there is no doubt, and very much importance is attached to preventive maintenance to keep this equipment in first class condition. Finance, alas, is probably the key. There are many differences between our respective requirements and practices but it would be worth setting up a working party to examine further those techniques whose adoption we might pursue with advantage, particularly in regard to the design of new hospitals.

Automatic Boiler Control

By A. J. LODGE
Kelvin & Hughes Ltd

AUTOMATIC Boiler Control is by no means a new concept and has, for many years, been a feature of Power Stations and other large steam raising plants. It would be true to say, however, that it is only comparatively recently that automatic control of smaller shell type boilers has been considered.

Automatic control, although varying in form and practice, is basic in principle. What, then, is the sequence of an automatic control system? It consists, firstly, of measuring the variable and converting this into some form acceptable to the controller. Appropriate action is then taken by the controller, based on the information received. Perhaps a good example of this is to be found in the boilerhouse in relation to control of feed water; in this case the water *level* in the boiler is the variable, which is detected or measured by displacement of a float which will cause the feed water valve to be regulated in accordance with demand. This sequence is often referred to as a closed loop, or self-balancing system. Without elaborating on these points, suffice it to say that, if a control system is to be effective, measurement of variables must be both accurate and continuous, and further, the control should be operated on the closed loop principle. These factors are important when considering automatic boiler control more specifically.

Is automatic control in the boilerhouse an essential, indeed can it be at all justified? It could be argued that, at present, many boilerhouses have modern boilers fitted with mechanical stokers, automatically operated elevators and ash handling plant, not to mention instruments capable of accurate indication and recording of all relevant data. Further, boilerhouses today are often attended by certificated operators and supervised by competent fuel efficiency engineers. Can additional capital expenditure be warranted?

The National Institute of Fuel Efficiency presents a picture which helps to provide the answer to this question. A recent survey was conducted on hundreds of boilers in this country. The following table relates target efficiencies to average efficiencies.

	Target Efficiency	*Average Efficiency*
Lancashire Boiler	65%	57%
Lancashire Boiler with Economiser	75%	65%
Economic Boiler	78%	69%
Vertical Cross Tube Boiler	60%	50%

A paper read at the Scottish Branches Weekend School.

From these figures it would appear that operating efficiency is still far from the ultimate in the boilerhouse, and considerable improvement could still be effected.

Due to the magnitude of the subject it is proposed, for the sake of brevity, to discuss automatic boiler control as applied to, say, a coal-fired Economic boiler, fitted with a mechanical stoker. Before going on to discuss this in detail, it would perhaps be interesting to highlight some of the difficulties an average boiler operator may have to contend with in an endeavour to maintain a reasonable combustion efficiency.

Pressure Control

It must be acknowledged that, with the best will in the world, the boiler operator has very little opportunity to maintain efficient combustion conditions and hold the pressure, unless dealing with a steady load. This latter point must be emphasised, as it obviously requires relatively little skill to control a boiler efficiently if the loading remains steady. Normally, the operator does not alter the firing conditions *until* there is a change in pressure as indicated by the boiler pressure gauge. In other words when the load change has already reached the boiler and the pressure has perhaps altered considerably. At best, it may only deviate a few pounds from the control point before alteration of firing conditions allows the steam pressure to be restored. On the other hand a considerable change in pressure may result in a longer interval before the pressure reverts to normal.

Pressure control thus becomes a complex function including such unpredictable variables as load demand, boiler response, boiler inertia and, perhaps, not least of all—boiler operators.

These points are aptly demonstrated in the average boilerhouse, equipped with a steam flow and pressure recorder, taken over, say, a 24 hour period. During the evening and night, when load conditions can often be relatively steady, one will find a fairly presentable pressure recording, varying as little as a pound or so either side of the control point. During the day, however, under widely varying load conditions, the pressure will tend to act almost inversely to the load and may swing from anything up to plus/minus 10 lbs.

This is the first point, then, due to lack of advance information the boiler operator cannot normally maintain a steady steam pressure. Obviously, optimum use is not being made of the heat input under

erratic firing conditions, and there is a resultant inefficiency.

Air/Fuel Control

This is a vexing problem—one which had never really been tackled seriously until very recently. It is a known fact that to burn, say, 1 lb. of coal effectively, a precise quantity of air is required. Because this fact is largely ignored, combustion efficiency suffers in consequence. The fundamental importance of CO_2 measurement in the boilerhouse is now widely accepted, but it is interesting to examine more closely the critical relationship between CO_2 and excess air. From the familiar table shown below it can be seen just how critical the air supply is, and how it is quite possible to burn the fuel thoroughly, and then to allow a good deal of the useful heat to be dissipated up the stack.

It has been found necessary in an industrial boiler to use 50% excess air in order that intimate mixing of fuel and air is achieved, thus ensuring thorough burning of coal.

Carbon burned in least possible volume of air	21%	CO_2
Typical Bituminous Coal burned in least possible volume of air	18%	CO_2
Coal burned with 50% excess air	12%	CO_2

CO_2	*Excess Air*
18%	0%
14%	28%
12%	50%
10%	80%
8%	125%
6%	200%
4%	350%

It is seen then that the ideal CO_2 is in the order of 12%. Should this figure be exceeded, resulting in a deficiency of " excess air," then coal will only be partially burned and an analysis of the ash will reveal an unnecessarily high carbon content, not to mention the fact that excessive smoke will be emitted from the stack. On the other hand, and this is much more common, what is the result if there is too much " excess air"?

First of all a large amount of undesirable and unnecessary cold air is induced into the boiler which will, in the first instance, tend to cool it down and then increase the velocity of the hot gases to an extent where optimum heat exchange is not possible. Secondly, the coal becomes thoroughly burned before it reaches the back of the grate. This will result in excessive grit emission, due to ash being lifted off the back of the grate. Most of the air now takes the path of least resistance, namely, the rear zone in the grate. It, therefore, may become increasingly difficult to maintain pressure, as the boiler output may be substantially reduced. It is worth remembering that three tons of coal fired at an efficiency of 50% provide no more steam than two tons fired at an efficiency of 75%.

Unfortunately, this problem is further complicated by the fact that, not only must correct control of fuel and air be effected at one point in the boiler's range, but this must be sustained throughout the whole turndown ratio of the boiler. It is perhaps here that the real adversary is revealed. The difficulty referred to is that, whilst a linear law governs the fuel fed to the boiler, a square law determines the air flow through the boiler. Unless the operator was aware and appreciative of this point, then he may assume, for instance, that if full load conditions demanded, say, 1" draught, then half load conditions would require $\frac{1}{2}$" draught. In fact, due to the square law principle, he would only require $\frac{1}{4}$" draught for optimum combustion.

Summing up the problems then in connection with control of fuel and air fed to a boiler to achieve maximum combustion efficiency—

1. The air must be controlled very carefully in relation to the fuel, in order to maintain a good CO_2 figure and resultant optimum combustion efficiency.
2. This relationship must take into account the linear law and square law governing the fuel and air flow respectively.
3. *The relationship of fuel and air must be maintained* over the whole turn-down range of the boiler.

Human Factor

Lastly, we are dependent on the human factor. Theoretically, as the boilerhouse is responsible for a fuel bill running often into many thousands of pounds per annum, it might be argued that they ought to be staffed by a fewer number of skilled technicians, and not unskilled labour as often applies. This, one supposes, resolves itself into a question of not so simple economics. There is a most commendable trend to give boiler operators an opportunity to become certificated. This trend, it is understood, is strongly supported by Hospital Boards. Boredom, fatigue, indifferent plant and working conditions, as well as the problems just examined, mean however that inefficiency can, and does, creep in.

AUTOMATIC BOILER CONTROL

Having examined the problems present to a greater or lesser extent in most boilerhouses, an examination of automatic boiler control will reveal how effectively these difficulties are overcome with a resulting increase in combustion efficiency. For convenience it is proposed to discuss a control system applied to a coal fired Economic boiler fitted

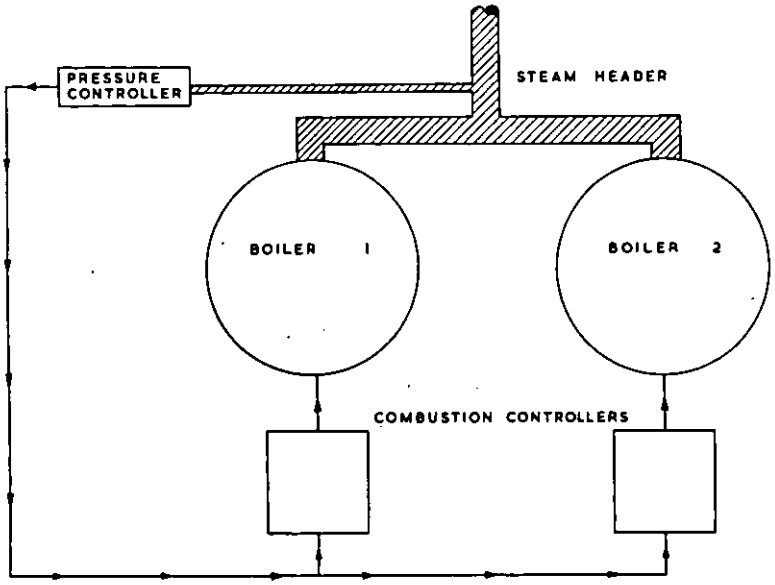


Fig. 1. Automatic Boiler Control.

with either chain grates operated by a D.C. motor, or, coking stoker operated by an A.C. motor. This boiler may have both forced and induced dampers. It will be assumed that the following conditions must be achieved by the control system:—

1. It must regulate the generation of heat in accordance with the demand, so as to maintain a steady pressure.
2. It must control the supply of fuel and air required for combustion in the correct ratio one to the other in order to obtain maximum combustion efficiency.
3. In some instances it will be necessary with certain types of stoker to control the pressure in the combustion space.

Fig. 1 shows a block diagram which illustrates very simply the broad sequence of events taking place in the control system.

The Pressure Controller is an instrument which is continuously and accurately measuring small changes of pressure in the main steam header. This information is converted into an electrical signal which in turn is fed to the Combustion Controllers. The prime purpose of the Combustion Controller is to regulate the generation of heat in accordance with demand, namely, to adjust the firing rate of the boiler, in order to maintain a steady steam pressure. Thus it can be seen that a much more strict control of pressure is possible with an automatic system. The reason for this is three-fold:

(*a*) by measuring pressure in the main steam header rather than at the boiler itself, advance warning is received of any load change *before* it actually reaches the boiler. By the time the boiler is subjected to the change in load, there has already been a corresponding alteration in firing rate.

(*b*) accurate and continuous measurement of pressure ensures that even a small deviation from control point will produce a related adjustment in firing rate. This action must be compared with the attention given to the boiler pressure gauge by the operator.

(*c*) by carefully controlling combustion in order to maintain optimum efficiency the full potential of the boiler is realised and proves to be more effective and faster responding in combating load changes than if controlled by hand.

By advance information, continuous accurate measurement and controlled combustion, it is thus possible to maintain a steady steam pressure irrespective of load change.

Air Flow Control

To control the air flow through a boiler, it is obviously necessary to make provision for positioning a damper, or dampers; but this requirement is immediately complicated by the fact that there is no simple relationship between the position of the damper and the actual air flow. Moreover, for any given position of the damper, the actual flow might vary, for example, due to changes in fan speed and/or in temperature. It is therefore essential that, in order to control the flow, it must first be measured. There are various ways in which it would be possible to make this measurement—for example, fitting an orifice or a pitot pipe in the ducting. Such methods would, in fact, derive a differential pressure which would vary in proportion to the square of the flow. Whilst it may be necessary to adopt these methods of obtaining a differential pressure in some cases, it has been found practical with most boilers to use

the restriction of the boiler passes to derive a differential pressure which varies very nearly as the square of flow. It has also been found in practice that an Economic type boiler steaming at full load has a differential pressure of approximately 2″ between its outlet and the position just above the fire, whilst a Lancashire boiler has a differential pressure usually less than 1″ w.g. and a Super-Economic boiler with high velocity flow may be as much as 4″ w.g. at full load. These pressure differentials are of an order which can easily be measured by conventional "slack leather" diaphragms situated in the Combustion Controller.

Fig. 2 is a diagram of the air flow control system. (1) is the servo-motor operated by the input signals received from the Pressure Controller and positioning its cam (2) in proportion to the boiler load. This cam moves a lever (3) thus increasing tension of the spring (4) which pulls the lever (5) to close the contact (6). This starts the damper motor (7) which turns in a direction opening the damper (8), causing an increase in the flow of air through the boiler. By virtue of its construction, the boiler and its tubes offer resistance to the flow. This resistance is shown diagrammatically by the restrictions (9). Consequently, a differential pressure is developed and this is fed via piping to the flexible diaphragm (10) in the Combustion Controller. This diaphragm therefore develops a force which is applied by means of the lever (11) to the lever (5), in opposition to the force of the spring (4), therefore tending to open the contacts (6) when balance has been achieved. The force developed by the diaphragm (10) varies approximately as the square law characteristic, so that the air flow is increased by this control system in proportion to the rotation of the servo-motor (1).

If the electrical signals indicate a decrease in load, the cam (2) rotates in the opposite direction relaxing the spring (4) and closing the contact (12), thus causing the motor (7) to close the damper (8) until such time as the force on the diaphragm has been again equalised—when the lever (5) will return to the neutral position. The relationship between the air flow and rotation of the cam can be adjusted by moving the pivot point of the lever (3) and this is made use of for an Air/Fuel ratio adjustment device (13). It will be seen that this air flow control system represents a closed loop control and is not in any way dependent on the characteristic of the damper (8).

In the cases where the boiler is operating either by natural draught or by induced draught, the air flow system requires only one damper as shown in Fig. 2, but where both forced and induced draught are provided a further complication arises, in that it is necessary to control both dampers in a suitable relationship to one another such that, whatever increase or decrease in flow takes place, the pressure over the fire is kept constant at between 0·02″–0·1″ w.g. below atmospheric. This requires the use of an additional controlling diaphragm in order to maintain the pressure balance. Detailed description of this arrangement is not proposed, as it is somewhat involved. Suffice it to say that information from three separate sources is fed to the Combustion Controller. This information is (*a*) change in steam pressure in the form of proportional electrical signal from the Pressure Controller, (*b*) draught differential across boiler, and, (*c*) over-fire suction. This information is interpreted by the Combustion Controller and, depending on whether there is a decreasing or increasing load, the correct damper is selected to move first, closely followed by the other. Due to a system of interlocking relays it is quite impossible for the combustion space to become pressurised at any time.

The air-flow through the boiler will thus fulfil three conditions at any time. It will always be the

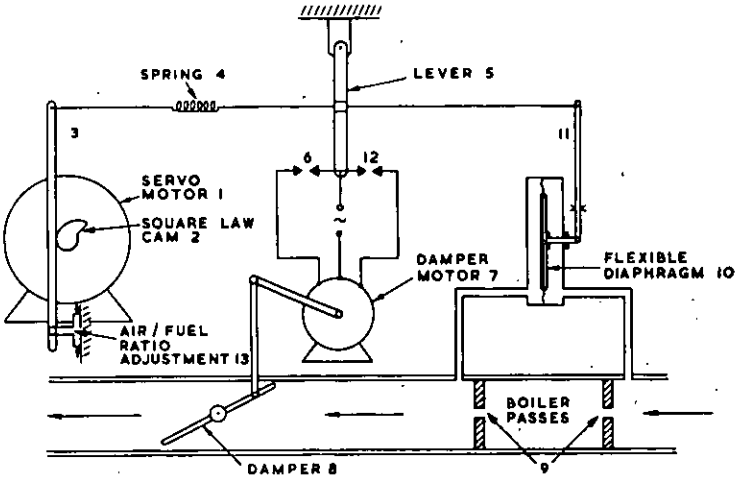


Fig. 2. Air Flow Control.

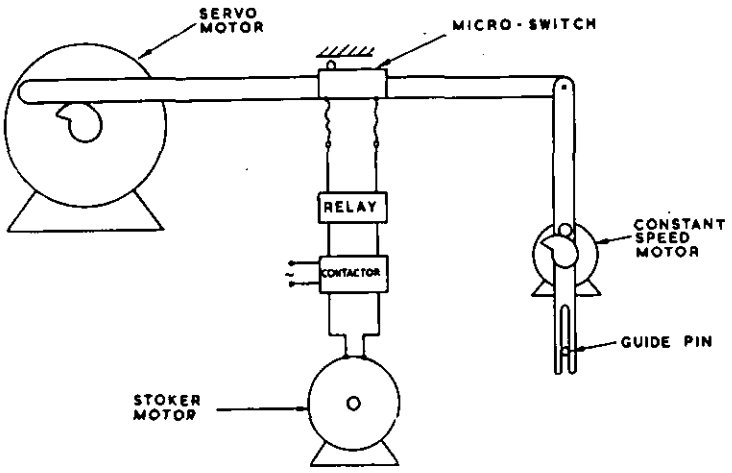


Fig. 3. A.C. Stoker Control.

precise amount for the quantity of fuel on the grate. It will be correctly related to the heat demand. The combustion space section will be in the order of 0·02″–0·05″ w.g. below atmospheric.

Fuel Control

A.C. Stoker Motors: Fig. 3 illustrates automatic control of A.C. stoker-motors.

A linear cam on the servo-motor shaft positions a lever carrying a microswitch. The other end of this lever receives vertical displacements from a linear cam on the shaft of a constant speed motor making one revolution in 90 seconds. The microswitch carried on the lever is therefore responsive to the combination of the positions of the two cams at its opposite ends. Hence, the position of the cam on the servomotor shaft determines the period for which the microswitch is closed during each revolution of the constant speed motor. The microswitch controls a relay which operates the contactor of the stoker motor.

A particular point to notice is that the stoker motor runs during the duration of each 90 second cycle when the microswitch is open, and the motor is stopped when the microswitch is closed. The arrangement is necessary so that, if the supply to the automatic control system is shut off, it is still possible to fire the boiler manually. There is provision for pulsing the stoker motor on manual control by means of a second motor and microswitch, the pulse length being adjustable by means of a knob on the Controller panel. This type of fuel control is suitable for almost any type of mechanical stoker which can be driven by an A.C. motor capable of being stopped and started once every 90 seconds. It should be explained that the motor starts at the commencement of each 90 second cycle, but runs for a proportion of the cycle which depends on the load. At full load the motor will run continuously; at half load it will run for half of each cycle.

It might be thought that running the stoker in this intermittent fashion would be undesirable for the maintenance of good combustion conditions. It should be borne in mind, however, that it takes between 10 and 20 minutes for a piece of coal to travel the length of a normal grate, so that interruptions to its progress are very small fractions of that time, and extensive testing has proved that the interruptions do not have any undesirable effect.

The choice of 90 seconds for the cycling time of the interruptions was made to take into account the fact that an A.C. induction motor ought not to be started up more frequently as it may tend to overheat, whilst, on the other hand, it is undesirable that the stoker should be stopped for longer periods.

D.C. Stoker Motors

It will be appreciated that although air flow control and fuel control are described separately both are adjusted simultaneously.

Many of the chain grate stokers in existence are driven by variable speed D.C. motors operated by means of a rectifier. The motors are usually shunt or compound wound types, and the method of control adopted is to leave the field excitation constant and vary the speed by adding resistance in series with the armature. To do this, a variable resistance in series with the armature is controlled by a servo-motor. The problem to be overcome is that the actual motor speed bears no fixed relationship to the series resistance, and therefore, in order to control the speed, it is necessary to measure it. It would be possible to attach a Tacho Generator to the motor to be controlled and thus feed back to the controller an electrical signal representing the motor speed, but a more economical method is to take advantage of the fact that if the field strength

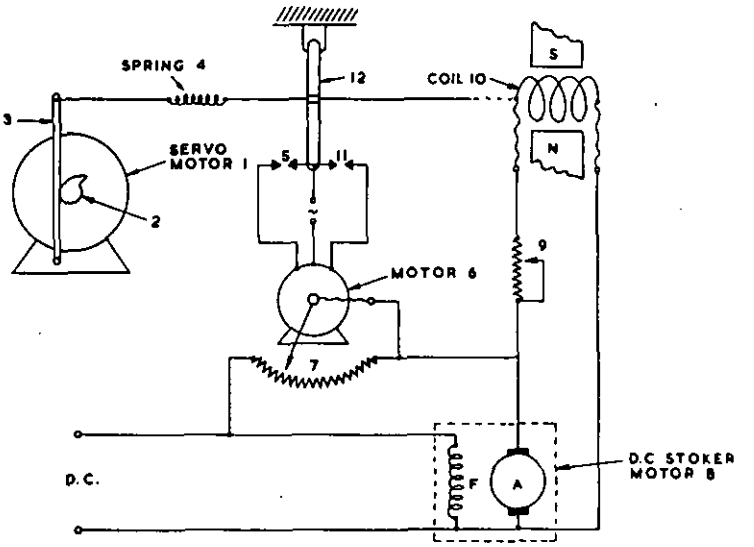


Fig. 4. D.C. Stoker Control.

of the motor is not varied, then the voltage across the armature varies linearly with speed, enabling it to be used as its own Tacho Generator. The Combustion Controller makes use of this fact, and a direct connection is made to the brush gear of the motor from which a voltage is fed back into a moving coil unit in the controller. This moving coil exerts a force which is balanced against a spring, tensioned by the cam on the servo-motor shaft, thus forming the closed loop speed control which is illustrated in Fig. 4. In this diagram (1) is a servo-motor which positions its shaft in accordance with the input signals from the Master Controller. The Shaft carries a cam (2) which moves a lever (3) increasing the tension of the spring (4). This closes the contact (5) which starts the motor (6), decreasing the variable resistance (7). As this resistance is in series with the armature of the stoker motor (8) the latter is caused to increase its speed, and at the same time the voltage across the armature of motor (8) increases. This voltage is fed through a resistance (9) to the moving coil (10) which is situated in the field of a permanent magnet. The consequent increase in the force produced by this coil acting in opposition to the spring (4), opens the contact (5) when the motor speed has been increased by the required amount.

On the other hand, if there is a decrease in load on the boiler, the cam (2) will be rotated in the opposite direction, relaxing the tension on the spring (4). This will cause the contact (11) to close, and the motor (6) will start to increase the value of the resistance (7), with the result that the stoker motor (8) will slow down. When it has slowed down by the requisite amount, as indicated by the position of the cam (2), the force produced by the coil (10) will have decreased until it is again equal to that of the spring (4), resulting in the lever (12) being restored to the neutral position with the contacts (5) and (11) both open.

The square law governing air-flow and the linear law governing the fuel are linked together, by mounting appropriate cams on the common shaft of the servo-motor. Thus the correct relationship between fuel and air is accurately maintained.

It will be seen that, in each section of the control system, two features are always present. The variable is being continuously and accurately measured whilst this information itself forms part of the closed loop system.

Economics of Automatic Boiler Control

The economics of automatic boiler control are best illustrated by reference to various different types of installation equipped with this system.

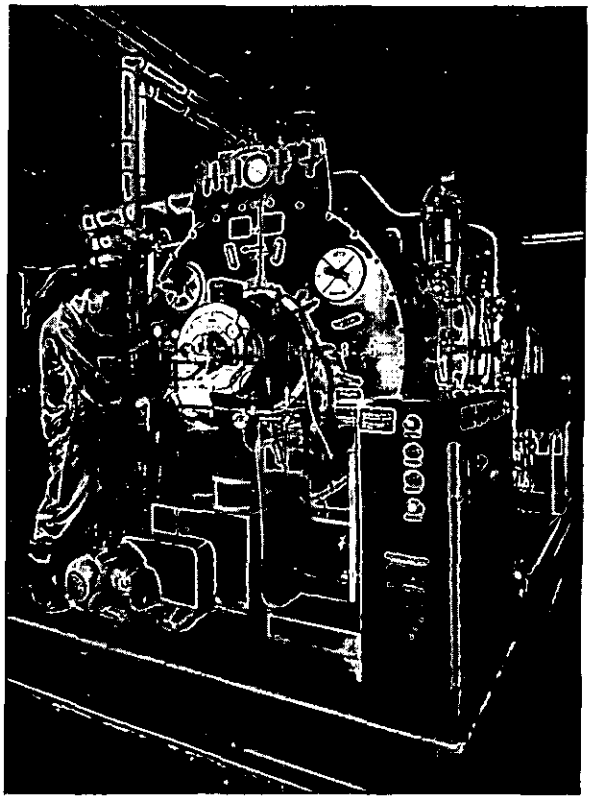
1. Rolls-Royce Ltd., East Kilbride: Boiler Efficiency raised by 5·3 per cent, fuel savings in three months amounted to £1,250—exceeding the cost of installation.
2. British United Shoe Machinery Co. Ltd., Leicester: Boiler Efficiency raised by 7·5 per cent—fuel savings in first twelve months £2,880—installation costs recovered in six months.
3. Strathclyde Hospital, Motherwell: Boiler Efficiency raised by 6·3 per cent—fuel savings in seven months £464, more than half the cost of installation.
4. British Oil and Cake Mills, Greenock: Boiler Efficiency raised by 6 per cent, equivalent to fuel savings in the order of 7 per cent. This is a Lancashire boiler installation.

Powermaster at Chandler's Ford Laundry

TWO years ago fire completely gutted the Hampshire premises of Chandler's Ford Laundry Ltd. Buildings, machinery, equipment and customers' orders were all destroyed. All that was saved were some of the company's records.

Today, however, Chandler's Ford Laundry, part of the Capital & County Laundries Ltd. group, is being rebuilt on the same site, and when finished, it will no doubt be one of the most unconventional laundries in Britain. All the equipment is modernistic, both in design and performance. A new boilerhouse has been installed which houses a Model 200 Powermaster oil-fired packaged boiler supplied by G.W.B. Furnaces Ltd. of Dudley, Worcs. Before the fire, the laundry relied on a hand-fed coal boiler, the steam output of which was 5,000 lbs. per hour. The Powermaster is capable of producing 7,000 lbs. of steam per hour with a pressure of 150 p.s.i. and is giving an efficiency of 83%. In actual fact, during the final firing test at the works of the manufacturer, the calculated efficiencies on high and low fire were 84 and 86½% respectively. The Powermaster, installed by the laundry's own engineering staff, has been shown to cope readily with sudden peak loads owing to its automatic operation which adjusts its steam output in accordance with the demands made on it.

Because it takes anything up to 50% less floor space than that required by an equivalent conven-



(Above)
Capable of producing 7,000 lbs. of steam an hour, the Powermaster has an efficiency of 83%.

(Left)
The feeding side of an all British equipped, high production sheet finishing unit. It is capable of completely finishing about 600 family sheets per hour.

tional boiler, the Powermaster was able to reduce initial boilerhouse building costs.

A 7,000 gallon oil storage tank is situated near to the boilerhouse. The oil passes through the pre-heater mounted on the boiler itself before being fed to the Voriflow medium pressure air atomising burner which is a patented exclusive feature of the Powermaster.

The boiler provides steam not only for laundry production, but also for thermostatically controlled heating of the factory, office buildings and canteen.

Average output of this laundry at the present time, though as yet it is not at full capacity, is 30,000 lbs. dry weight a week. White work is processed in two, six-unit Engelhardt & Forster contra-flow washing machines, each having a capacity of 700 lbs. dry weight per hour.

The laundry building itself is extremely contemporary in design. It has a very high thermal insulation and the structure of the roof is aluminium decking, with a double-glazed roof light, surmounted by a wide opening colt ventilator.

The interior colour scheme of the building is Venetian blue, cream and grey, and the racks and machinery are a matching blue.

Steam and water pipes, and the electrical wiring, all flow underground to each piece of machinery.

A sheet ironing unit, manufactured by Tullis, is fully mechanised and operated at 80 feet a minute. It is capable of finishing 600 sheets an hour.

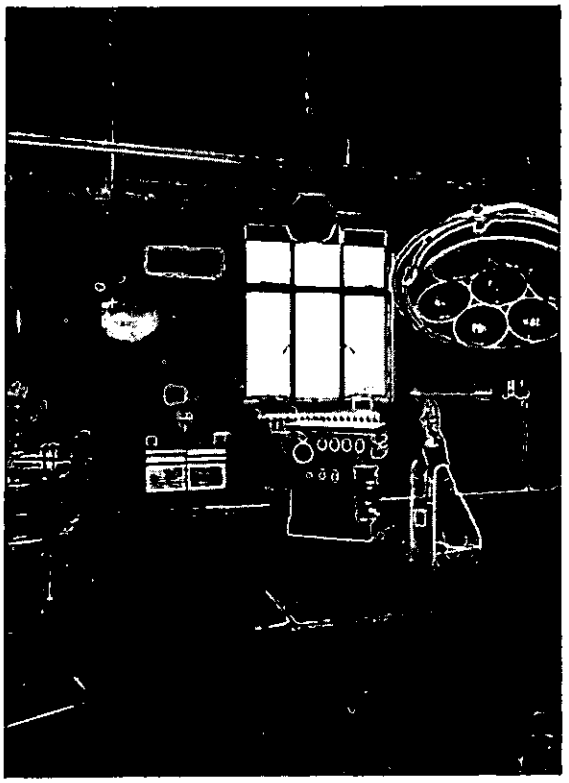
The activities of Chandler's Ford Laundry include, as well as domestic and contract work, a linen hire service to hotels and shipping concerns. An interesting feature of the contract work is that the laundry offers a guaranteed delivery service of four hours for ships laundry, when sometimes there are as many as 5,000 items to be laundered.

The laundry itself is situated in a wooded, residential suburb midway between Southampton and Winchester, surroundings into which it fits ideally. This is possible because its boiler is both smokeless and noiseless, hence the company has no nuisance problem.

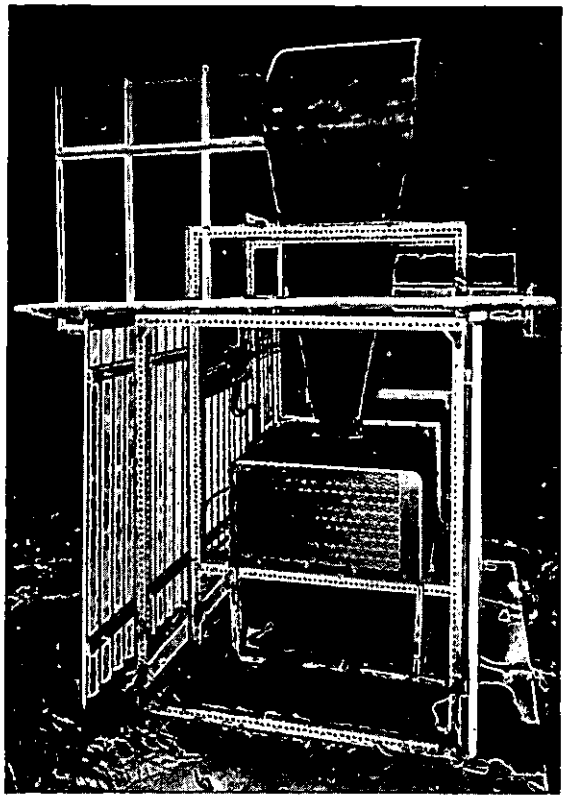
Conditioned Air in Friarage Hospital Operating Theatre

EXCESSIVE heat build-up was found to be unavoidable during the summer months in the operating theatre at Friarage Hospital, Northallerton, where a ventilating plant to supply fifteen air changes per hour and pressurize the room was fitted. To overcome this, two air conditioning units have been installed which provide the necessary cooling. These units have proved much simpler and more economical to install and run than purpose built air conditioning plants incorporating refrigeration, which were at first considered. The units have been in operation for some weeks and, we understand, have brought very favourable comment from the medical staff.

The main operating theatre, 27 ft. × 23 ft., 12 ft. high, was equipped with a ventilating plant which distributes filtered fresh air by ceiling diffusers. The theatre is thus pressurized and, during the cold months, the system proved satisfactory. During the warmer months, however, temperatures in excess of 85° F. occurred frequently, making operating conditions very uncomfortable.



Interior of the operating theatre showing ultra-violet radiation at high level.



A Westair Model 1·5 Ducted Climatizer showing inlet is adjacent and outside of Operating Theatre with silencer on the conditioned air-outlet.

The hospital authorities obtained two Model 1·5 Westair Climatizers for conditioning the theatre air in conjunction with the existing ventilation plant. These units comprise a hermetically sealed refrigeration system, and were installed without considerable building alterations. The first cost was negligible when compared with purpose built refrigeration plants.

Some difficulties had at first to be overcome. The units had to be prevented from becoming breeding-grounds for bacteria. They were, therefore, fitted with special plastic-fibre air-filters with low-face velocity and high filtration efficiency. These filters trap particles entering the unit, and keep the unit clean. They are changed and sterilized every day. In addition to this filtration, germicidal ultra-violet irradiation tubes were installed in the re-circulating air ducting immediately behind the filters, the bactericidal action being concentrated on the filter surface itself as well as on the slow air-flow past the tubes, and also on the surface of the re-circulated air ducting. People in the theatre are protected from the ultra-violet irradiation by the return air grille, and a failure indicator panel shows when any ultra-violet tubes have stopped functioning.

Another problem was the sound level of the units which was intolerable in operating conditions. The units were, therefore, fitted with special silencers on both the return air side and the conditioned air side. This was successful, and also provides the interconnecting ducting between the operating theatre and the air conditioners placed in a lean-to outside.

The units are situated at opposite ends of the theatre and the conditioned air-flow is deflected by doubly adjustable discharge grilles to the centre of the theatre, where the resulting terminal velocity is barely noticeable.

The soundness of the installation, which is particularly advantageous as to cost and running, is emphasized by the fact that the Heating and Ventilating Research Association is about to investigate the use of self-contained air-conditioners for air-conditioning in hospitals.

We are indebted to the Newcastle Regional Hospital Board, Northallerton Hospital Management Committee, and B. A. Poole & Partners, for permission to use this information. The manufacturers of the air-conditioning units are Westool Ltd. of St. Helen's Auckland, Co. Durham.

Abstract of Reports

MID-GLAMORGAN H.M.C.

The annual report for the year ending December 31st, 1959, shows that there has been a further decrease in the waiting list for beds over previous years, although this is not the case at Neath General Hospital in so far as general, surgical, traumatic and orthopaedic cases are concerned.

The new out-patient accommodation at Neath and Port Talbot General Hospitals is considered to be a vast improvement on the original facilities available. Building work for the provision of a new O-P department at Bridgend General Hospital was commenced in 1958 and is progressing well, but will not be completed until early in 1962.

The R.H.B. Pharmaceutical Working Party has strongly supported the views of the H.M.C. that a new department should be built, as the present one is completely inadequate. The system of pre-sterilized packs of dressings introduced in the previous year by the chief Pharmacist at Neath Hospital has proved to be a complete success and has aroused considerable interest all over the country.

The report states that new capital work in the Mid-Glamorgan Area has been limited to one scheme only during the year 1959. It is hoped that the Regional Board can see its way clear to proceed during the next financial year with some of the more urgent schemes which have been brought up to working drawing stage.

At Bridgend Hospital the extension of the main kitchen and the provision of kitchen stores and central stores was completed. The new boiler house, with three oil-fired boilers, which is in course of erection, is expected to be completed by November 1960. The existing boilers are barely capable of meeting present demands.

It is expected that steps can be taken during 1960 to improve the Orthopaedic and Casualty departments, and the Mortuary, and to provide for a new Pathology Department.

Sketch drawings for a new boiler house with two oil-fired boilers for Port Talbot General Hospital have been approved and it is intended that building work should commence early in 1960. Here, again, the present boiler capacity is barely able to meet the present demands.

A short-wave staff location system was tried out at Neath General Hospital and as a result will now be introduced on a permanent basis.

Additional equipment has again been provided for the Laundry but it is proving increasingly difficult to meet demands.

As the boilers at Neath Hospital are electrically controlled, a generator has been installed and this has made it possible to provide emergency lighting throughout the whole hospital.

A considerable amount of exterior painting has been carried out at this hospital, and at Cefn Hirgoed, and a good deal of interior decorating has been completed throughout the Group. In addition, extensive engineering and electrical work has been carried out at Bridgend Hospital.

At Neath Hospital, also, a new steam main has been run to the laundry and new drying cabinets have been provided.

THE LIVERPOOL AND DISTRICT FAZAKERLEY GROUP H.M.C.

The report of the Management Committee for the year ending March 31st, 1960, shows that in regard to fever hospitals things have changed over the last twenty years and Fazakerley, for instance, carries out a quite different function, the demands of scarlet fever and diphtheria having been considerably reduced and having given place to requirements of other kinds.

The demands upon the Aintree Hospital resulting from the mass radiography campaign were lower than had been expected and no patient had to wait for admission. The report adds that it is unlikely that all the beds in this hospital will again be needed for tuberculosis cases and the use of empty wards for other types of case is to be encouraged.

At Aintree Hospital it is planned to change over from drums which are expensive and easily damaged, to the " pack system " for dressings, theatre, linen, gloves etc. This system has been well tried in other hospitals and provides a cheap, safe, and efficient way of dealing with sterile materials.

At the North Chest Clinic, 1959 has been a year of great achievement and three thousand more patients have been seen. This put a great strain on the organisation, but schedules were adhered to and patients seen expeditiously.

A new " Kentdale " washing machine and 36 inch hydro-extractor were provided for the laundry, and a survey has been carried out by the Ministry's laundry engineer in regard to the future requirements for the proposed new general hospital of 600 beds.

Engineering work carried out during the year includes the conversion of eight solid fuel boilers to oil-firing, the replacement of a vertical cross-tube boiler in the annexe and modifications to the ventilation systems in the X-ray department, Laundry and Occupational Therapy workrooms, etc. All of this applies to Aintree Hospital.

The Liverpool R.H.B. has approved in principle the siting of a new medium stay psychiatric rehabilitation unit of 344 beds at Fazakerley, and a detailed case for this has been submitted to the Ministry.

LIVERPOOL REGION CHILDREN'S H.M.C.

This report for the year ending March 31st, 1960, covers the activities of all their Alder Hey and Olive Mount Children's Hospitals and the Royal Liverpool Babies Hospital.

In June of the year under review the British Paediatric Surgeons held their conference in Liverpool, and Alder Hey Hospital was host for a number of the meetings. In association with the University of Liverpool this hospital is taking an increasing part in providing facilities for such meetings. The interest of these organisations is encouraged by the special departments of the hospital and it is interesting to note that further special departments have been opened. For instance, the hospital now has a special Burns Ward with six beds and a Psychiatric ward with 11 beds, both of which were newly opened during the year. In addition, the Neonatal Surgical ward was extended and an Electro-encephelograph department was established.

The Committee is concerned at the continued low bed occupancy at the Royal Liverpool Babies Hospital, and a Mother and Baby Unit has been set up in an endeavour to make full use of the facilities.

Improvements carried out at Olive Mount Children's Hospital will enable it to take a fuller part in the special accommodation which is required in certain periods of the year for very young children.

Additional monies have been allocated during the year and these were applied to arrears of repairs. Consequently, extensive renovations have been completed throughout the group. Proposals are now being considered for attention to old stone floors and staircases, which are to have special coverings and which will reduce the present laborious cleaning methods.

CARDIFF H.M.C.

A frustrating feature referred to in the report of this Committee for the year ending March 31st, 1960, concerns the number of improvements which, owing to the interpretation of the Ministry regarding Capital Works, have not been able to be carried out by the Committee as

items of maintenance, and there are now a list of some 39 such schemes outstanding.

A remarkable change has also taken place in this Group regarding the number of beds needed for tuberculosis cases and it has been possible to allocate some of these as additional beds for chronic sick and a limited number of extra medical beds. The ex-Ministry of Pensions Hospital, Rookwood, has been incorporated smoothly.

Miss E. Pitt, Parliamentary Secretary to the Ministry of Health, visited Rookwood and St. David's Hospitals in November.

A system of television incorporating the reception of sound through headphones, which was installed experimentally at Glan Ely Hospital, has now been introduced into the remainder of the large hospitals within the Group.

The £85,000 scheme for the modernisation of the Maternity Department at St. David's Hospital has been implemented and the first stage was completed in October. The modernisation of geriatric wards has now been completed, although a certain number of beds has been lost as a result. The P.M. Room and Mortuary have been remodelled and developments have taken place at the Laundry at St. David's which now caters for three other hospitals in the group. The Regional Board has agreed to provide further storage equipment in the near future. A new fire alarm system and a modern staff location system have also been installed.

Orders have been placed for the installation of high pressure sterilisers for Sully Hospital and a good deal of medical and dental equipment, including a Melrose heart-lung machine, has been provided. The Pathological Laboratory has been extended by the construction of an additional floor to that department.

Two hydro-extractors have been replaced in the Laundry and an additional tumbler dryer installed to replace the continuous blanket dryer which was bulky and obsolete. As a precaution against Mains supply failure an emergency generator has been provided sufficient to cater for lighting, the lifts and medical suction plant, and a supply to the Angiocardiography apparatus.

At the Prince of Wales' Orthopaedic Hospital a Hydro-therapy Department has been completed which is believed to have no superior in Wales. A number of other improvements have been made including the installation of a duplicate of the main X-ray diagnostic sets.

Lansdowne Hospital is concerned primarily with infectious diseases. Because of the reduction in the number of these it has been possible to re-allocate two wards to gynæcology. A new Boiler House has been built here and an emergency generator installed. The Laundry now undertakes work for domiciliary patients on behalf of the Cardiff City Corporation.

It was necessary to close Barry Accident Hospital for a few months in order to carry out comprehensive alterations, and this included the complete modernisation of the Operating Theatre suite and the provision of a new Mortuary, viewing room and Post Mortem room, and a new Casualty Department. In addition, a central heating system with mechanically stoked boilers has been installed. During this period a number of beds were made available at Sully Hospital.

BURNLEY & DISTRICT H.M.C.

A most disappointing feature in the field of capital development is referred to in the Report for the year 1959–60 of Burnley and District H.M.C. and relates to the discovery that it would not be possible to proceed with the building of a new ante-natal clinic at Bank Hall Maternity Hospital owing to the danger of subsidence. The clinic will now be incorporated in a scheme to provide a new maternity unit at Burnley General Hospital.

Among those schemes completed during the year was the upgrading of the male Psychiatric Unit at Burnley Hospital, the provision of a post-operative observation ward at Reedyford Memorial Hospital, improvements to the Casualty Department at Victoria Hospital and the upgrading of the Butterworth Ward at the same hospital.

There have been considerable staff difficulties, and local General Practitioners were called in to help maintain the casualty service at the Reedyford Hospital during a period when it was impossible to obtain whole-time resident medical staff for this purpose.

It is hoped that the R.H.B. will soon begin the planning of the new O.P. Department at Burnley Hospital which will include an X-ray department. The present accommodation where diagnostic as well as deep therapy treatment is undertaken has proved quite inadequate.

The Report states that last year was a busy one for the newly equipped Isotope Laboratory forming part of the Pathological Service. Thyroid uptake tests, fat excretion tests and Vitamin B.12 absorption tests have been done and the importance of these tests is increasing. The work of the Central Sterile Syringe Unit has further developed during the year and the service is now available to General Practitioners throughout the district.

Both the Engineering and Works Departments have been strengthened by the appointment of additional staff, and an apprentice training scheme has been introduced which will provide training for one apprentice in the electrical, engineering, plumbing and painting trades.

The centralisation of the laundry service has been completed and a work study has been carried out at the Burnley Hospital Laundry as a result of which various recommendations have been made and, in the main, introduced. These, which include replanning and re-equipment, will result in the reduction of the staff from 45 to 32. Automatic washing controls are being introduced and machines are being equipped with individual drive.

A third Lancashire boiler, together with the installation of coal elevators to each boiler, has been carried out at Burnley Hospital and work has continued on the replacement of the main water supply throughout the hospital.

The re-opening of the Casualty Department at Victoria Hospital was the most important event during the past year in which the upgrading of the female surgical ward was completed and the scheme to re-wire the hospital in stages continues. Work has also commenced on the third stage of renewing the heating services. The Regional Board arranged for the ventilation of the sterilising room in the Ophthalmic Theatre to be improved and also to install a new ventilating system in the twin Operating Theatres. The sluicing accommodation for the Medical wards was improved during the year and a considerable amount of deferred maintenance work was undertaken.

Northern Ireland Engineers visit Stanlow

SHELL-MEX and B.P. Ltd. were the hosts to a party of Northern Ireland Hospital Engineers on a one day visit to Stanlow, Cheshire, on October 20th, 1960. The party included members of the Northern Ireland Branch of the Institution of Hospital Engineers.

Stanlow is the largest of the four refineries operated by Shell in the U.K. and stands beside the Manchester Ship Canal. The refinery extends over some 1,800 acres and is 2½ miles from end to end. 1,300 acres are already fully developed and the remainder is in the process of being developed. There are fifteen miles of roadway, 20 miles of rail track and 1,000 miles of pipeline running in 8 systems. There are some 5,300 employees, of which 1,300 are employed in the Operations Department, 1,700 in the Engineering Department and 1,200 administration staff. This does not include 1,000 more at the Associated Research Centre of Thornton.

The refinery uses more water and electricity than the City of Chester (population 50,000). Each month, for refining 500,000 tons of oil, Stanlow uses 550,000 tons of fresh water drawn from fourteen wells on and around the site, and converts some 200,000 tons of it into high pressure steam. In one month, too, 8½ million units of electricity are consumed, and 13 million tons of water per process cooling are pumped from the nearby Canal and returned through a 341 foot high cooling tower, the largest in the world.

Transport of crude oil from the Middle East to Stanlow calls for the continuous operation, on shuttle service, of 60 ocean going tankers. The tankers berth at Eastham, seven miles from Stanlow, where the Queen Elizabeth II Docks, built by the Manchester Ship Canal Company at a cost of £5 million, covers 19 acres and can accommodate four 30,000 tons Super-tankers at one time. In addition, there are six tanker berths in the canal itself near Stanlow for outgoing products. The refinery is served by fully equipped laboratories, workshops, canteen and medical centre.

The varied nature of the activities within Stanlow Refinery, illustrated by these few figures, have the common purpose of ensuring the uninterrupted flow of oil through the processes which go on day and night throughout the year.

It will also be seen from the foregoing that a by-product or product from one process is often the intake material for another. This direct linking or integration of processes, when practised on such a scale as at Stanlow, demands great organisation and unremitting attention on the part of the refiner, and although he seldom actually sees the oil during its passage through the plants, its properties are nevertheless known to him at every stage in its journey. Numerous instruments give him the outward indication of what is happening within the complex systems of pipes and vessels. Many of these instruments may be set to correct and to control automatically the course of refining, giving at the same time a written record of their work. Laboratory analyses are indispensable in maintaining steady operation, and all outgoing products are subject to the strictest inspection.

The extensive workshops and filling department were the final ports of call before lunch which was served in the staff dining room at the refinery.

The Northern Ireland Branch of the Institution of Hospital Engineers is grateful to the Shell-Mex and B.P. Co. Ltd. for the privilege of visiting Stanlow Refinery and for all the attention and hospitality received there.

BROADBENT-MANLOVE ALLIOTT AGREEMENT

For some time past Thomas Broadbent & Sons Limited and Manlove Alliott & Company Limited have been co-operating on High Speed Flatwork Finishing installations—many launderers have seen the joint film which the two firms produced showing the set up at Una Star Laundry in Southampton.

It has now been decided to extend this co-operation and formal agreement has been reached between the two firms whereby Manloves will offer Broadbent Folders exclusively as standard equipment with their High Speed Flatwork Units. Users of Manlove's own Sheet Folders are, of course, assured of continued Spares and Maintenance Service.

NEW WORKS DIRECTOR OF BAILEYS

Sir W. H. Bailey & Co. Ltd. announce the appointment of Commander E. G. Sutton, M.I.Mech.E., R.N. (Rtd.), as works director.

In his new position he will be responsible for the production of the whole range of pressure regulators, sluice valves, pumps and turnstiles manufactured by Sir W. H. Bailey & Co. Ltd.

MULTITONE IN AMERICA

We learn that the Multitone "Personal Call Pocket Staff Location System" has now been installed in the Johnston-Willis Hospital in Richmond, U.S.A. Sales were conducted through the Company's Canadian subsidiary.

B.S.I. News

Abstracts of information supplied by the British Standards Institution

B.S.I. PUBLICATIONS—SPECIAL ISSUE

B.S. 2742M : 1960 Miniature smoke chart. Single copies 3/–; 12 copies 24/–; 144 copies £10

A chart, printed in shades of grey matt lacquer, which when held at about 5 ft. from the observer gives readings of the density values of smoke from chimneys. These are comparable with those obtained from the B.S. Ringelmann Chart (B.S. 2742C). The method of use is explained in an amendment to Chart B.S. 2742 (PD 3901).

NEW BRITISH STANDARDS

B.S. 3016 : —— Pressure regulators for use with butane/propane gases

3016 : Part 3 : 1960 Variable high pressure regulators. 5/–

Specifies materials, construction, performance and testing requirements for variable high-pressure regulators for butane and propane in the vapour phase above 20 in. w.g. (51 g/cm.^{2}) outlet pressure.

B.S. 3272 : 1960 Aluminium food storage bins. 3/–

Covers two sizes of aluminium alloy bin suitable for use in school kitchens and other large scale catering establishments. The bins are rectangular in shape with rounded corners. The larger size holds approximately one hundredweight of various foods and the smaller approximately half the amount. Each is of an overall height to enable it to go under a bench or shelf and stands in a frame mounted on four castors. Dimensions, materials, construction and finish are covered.

B.S. 3274 : 1960 Tubular heat exchangers for general purposes. 20/–

Specifies design, construction, inspection and testing of cylindrical shell and plain tube heat exchangers for general applications within the range of nominal shell diameters from 6 in. to 42 in., with tube lengths from 6 ft. to 16 ft., and tube diameters from ¼ in. to 1¼ in.

The following types of heat exchanger are included:

Type 1. Fixed tube-plate (non-removable tube bundle)

Type 2. U-tube (removable tube bundle)

Type 3. Floating head (removable tube bundle).

REVISED BRITISH STANDARDS

B.S. 1431 : 1960 Wrought copper and wrought zinc rainwater goods. 6/–

Deals with the manufacture of half round, rectangular and ogee gutters, round and rectangular pipes and accessories in copper and zinc in sizes 3, 4, 4½ and 5 inches for gutters and 2, 2½, 3 and 4 inch for pipes.

An appendix deals with fixing and brackets.

REVIEWED AND PROPOSED FOR CONFIRMATION

B.S. 1307 : 1946 Gas-fired boilers and waste-heat boilers (with or without auxiliary firing)

AMENDMENT SLIPS

	Ref. No.
B.S. 122 Part 1 : 1953 Milling cutters. Amendment No. 4	PD 3894
480 : —— Impregnated paper-insulated cables for electricity supply Part 1 : 1954 Lead or lead-alloy sheathed cables for working voltages up to and including 33kV. Amendment No. 4	PD 3895
Part 2 : 1954 Aluminium sheathed cables for working voltages up to and including 22kV. Amendment No. 4	PD 3896
B.S. 1259 : 1958 Intrinsically safe electrical apparatus and circuits for use in explosive atmospheres. Amendment No. 3	PD 3888
B.S. 1299 : —— Tumbler-switches and associated switch-plates and switch-boxes. Part 1 : 1946, 5-ampere flush-type. Amendment No. 4	PD 3897
B.S. 1762 : 1951 Woollen felt and woollen mixture felt for bedding, upholstery and similar purposes. Amendment No. 1	PD 3873
B.S. 2606 : 1955 X-ray protective gloves for medical diagnostic purposes up to 100 kV peak. Amendment No. 1	PD 3898
B.S. 2742 : 1958 Notes on the use of the Ringelmann chart. Amendment No. 1	PD 3901

(see Special Issue, B.S. 2742M, above).

REPRINTS

*B.S. 116 : 1952 Oil circuit-breakers for alternating current systems. 17/6

*B.S. 2083 : 1956 Dimensions of 3-phase electric motors (totally-enclosed fan-cooled). 3/6

*B.S. 2848 : 1957 Flexible insulating sleeving for electrical purposes. 6/–

Reprints marked * have had amendments incorporated in the text of the standard.

DRAFT STANDARDS CIRCULATED FOR COMMENT

AA(M)2018 Aluminium food storage canisters (for use by Local Authorities). (5 pp.)

AA(MEE)2243 Cast iron gate valves for general purposes. (24 pp.)

AA(SFE)2413 Measurements of smoke emission from industrial boilers. Coal fired shell boilers with various types of mechanical stokers. (B.S. 2978, Part 2). (17 pp.)

AA(TLB)2427 Information about plywood. (28 pp.)

AA(MEE)3028 Transmission steel roller chains and chain wheels (revision of B.S. 228). (25 pp.)

AA(B)3327 Glossary of general building terms. (30 pp.)

THE MARCH OF STANDARDS

B.S.I.'s report for 1959–1960

The 1959–1960 report of the British Standards Institution shows that the 12 months' period to March 31st was a busy and successful one from the standards viewpoint.

It was a year of record output with 297 new or revised British Standards published—that is substantially more than one for every working day of the week.

There were record sales, too, of nearly 1,100,000 British Standard publications, about one-quarter of which went overseas.

The number of subscribing members was also at a peak figure of over 11,000.

The record of "work-in-hand" makes it clear that B.S.I.'s range of activities is becoming ever more extensive and suggests that in the coming year or two the output of standards will be at least as high as in the year under review.

The opening during the year of B.S.I.'s centre at Hemel Hempstead provided a central point for testing and inspection under a number of Kite-marking schemes.

MINIATURE SMOKE CHART (B.S. 2742 M)

When the British Standard Ringelmann chart is used to assess smoke density, it needs to be located at a distance from the observer, and in a particular position in relation to the smoke discharge being examined. Such a limitation makes its use inconvenient in certain circumstances and attempts have been made to devise other means of comparison which are not so restricted. B.S. 2742 M—a miniature smoke chart—has been developed for just this purpose.

The grey shades painted on the chart have been found to give results in good agreement with those obtained by the Ringelmann chart. The miniature smoke chart is not, at this stage, offered as a complete substitute, but it is hoped that experience with it will confirm the preliminary findings and enable it to achieve equal status with the Ringelmann chart proper.

An amendment (PD 3901) to B.S. 2742 M "Notes on the use of the Ringelmann Chart" has been issued to explain the method of use, and a summary of it is printed on the envelope containing the miniature smoke chart.

ALUMINIUM FOOD STORAGE BINS (B.S. 3272 : 1960)

Requirements for aluminium alloy food storage bins, suitable for use in school kitchens and other large-scale catering establishments, are laid down in this new British Standard.

Prepared at the request of the Local Authorities Standards Advisory Committee, the standard is based on the recommendations of a sub-committee on school catering equipment.

Two sizes of bin are provided for: one, 16 in. by 16 in. by 30 in. high, large enough to hold about 1 cwt. of various foods; the other, 16 in. by 16 in. by 20 in. high, large enough to hold about ½ cwt. Both bins are within an overall height to enable them to go under a bench or shelf.

SILICONE-RUBBER-INSULATED CABLES AND FLEXIBLE CORDS (B.S. 3258 : 1960)

This new British Standard has been prepared in view of the increasing use of silicone-rubber-insulated cables and flexible cords. It covers a range of these cables and cords in conductor sizes up to 0·06 sq. in. suitable for a maximum conductor operating temperature of 150°C.

The specification takes the same general form as other British Standards for rubber-insulated cables but is confined to single-core, twin and three-core cables and cords finished either with glass braid and silicone varnish, or with asbestos braid and heat-resisting compound.

IDENTIFICATION OF PIPELINES (B.S. 1710 : 1960)

A sound colour-identification scheme for pipelines is essential in countless spheres of industry. Neither safety nor efficiency is assured where labyrinths of pipes abound, their contents often enigmatic until someone—perhaps an unsuspecting maintenance engineer—becomes the victim of an accident.

Hence the importance of this revised British Standard, with its recommendations for an identification colour code. It applies to pipelines in buildings, industrial installations and on water and land transport.

British Standard ground colours are specified to distinguish between the various classes of contents—white for air, canary yellow for town gas, dark grey for chemicals and so on. Colour bands are specified to individualize within classes; for example, a pipe containing butane would be dark grey, with a red band; one containing carbon monoxide would be dark grey with red and yellow bands. Lettering is recommended in certain instances.

The committee of experts responsible for the standard have not overlooked the needs of the atomic age. Hazard markings have been introduced for use when the contents of a pipe may be radio active. A pipe with a light orange ground and black diagonal crossed stripes, for example, would indicate the presence of heavily radio-active hazards.

The 16-pp. standard contains five pages of fully annotated colour diagrams.

THERMOMETERS FOR MEASURING AIR COOLING POWER (B.S. 3276 : 1960)

This new British Standard specifies the essential requirements of a series of thermometers for measuring low wind speeds or the efficiency of ventilation in ships, factories, hospitals, mines and so on. It includes standard charts, in the form of nomograms, which enable the "cooling power" of the atmosphere and the air speed to be derived from the air temperature and the time taken for the heated thermometer to cool between two specified temperatures 3°C. or 5°F. apart. For the convenience of users, there is a list of references to published studies on the practical use of this type of thermometer.

RECTANGULAR METAL BOXES FOR USE IN HIGH VACUUM STEAM STERILIZERS (B.S. 3281)

Two sizes of rectangular metal sterilizing boxes, suitable for holding dressings and surgical rubber gloves and intended for use with high vacuum steam sterilizers, are specified in this new British Standard. Requirements are also laid down which will ensure that the container is of robust construction and that there is adequate means of ingress or egress of steam and air.

The standard has been published to ensure that the best use is made in the available space in the sterilizing chamber of the sizes specified in B.S. 3220, "Horizontal rectangular hospital sterilizers—pressure steam type."

TUBULAR HEAT EXCHANGERS FOR GENERAL PURPOSES (B.S. 3274 : 1960)

This much-needed British Standard specifies minimum requirements and gives guidance for the mechanical design and construction of shell-and-tube heat exchangers, a specialized form of pressure vessel widely used in industry for such purposes as heating, cooling, evaporating and chemical reaction.

Information supplied by the Tubular Heat Exchanger Manufacturers' Association (T.E.M.A.) and the American Society of Mechanical Engineers has been used in the preparation of the standard and the recommendations of B.S. 2041 (Tubular heat exchangers for use in the petroleum industry) have been taken into account wherever applicable.

The standard covers cylindrical shell and plain tube heat exchangers for general applications within size ranges of 6 in. to 42 in. for nominal shell diameters, of 6 ft. to 16 ft. for tube lengths and of ¾ in. to 1½ in. for tube diameters. The following types of heat exchanger are included: fixed tube plate (non-removable tube bundle), U-tube (removable tube bundle) and floating head (removable tube bundle).

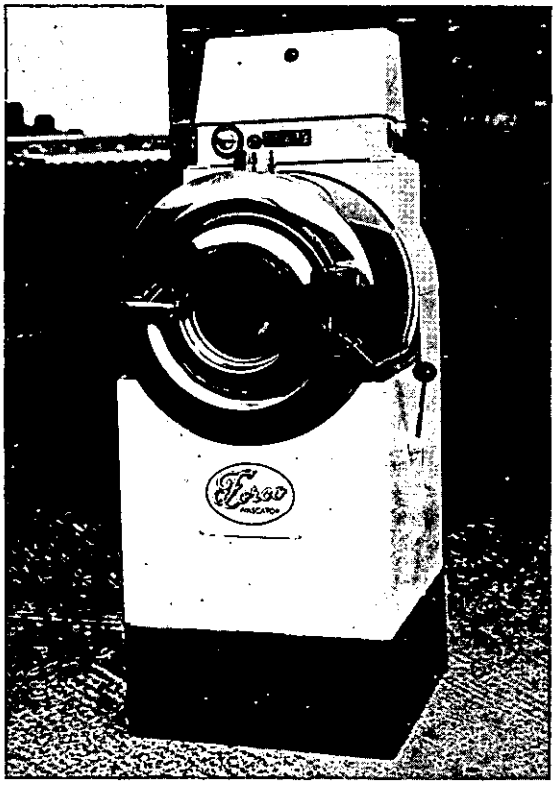
Because a wide range of heat exchangers exists, more sizes have been listed than desirable in a standard. Industry is asked to encourage the use of those sizes asterisked as being preferred so that eventually it should be possible to cut out the other sizes.

Forco "Autosluicer"

A new range of automatic sluicing machines has been introduced by D. S. Fordyce & Co. Ltd., Uphall Road, Ilford, Essex, to meet the various needs of hospitals at ward and also laundry level.

The Forco " Autosluicer " is being produced in three sizes, 12 lb., 24 lb. and 35 lb. dryweight capacity, so that the correct size machine may be installed whether sluicing is undertaken at a centralised laundry, or on a small more local scale. All the machines are an adaptation of the well-established range of Forco Washers and are constructed from stainless steel. An important feature of these end-loading machines is the high-speed extraction designed to improve the efficiency of the sluicer and to ensure that as work is removed from the cage no water drips on to the floor.

Fully automatic in operation and requiring no skilled attention, the " Autosluicer " is set in operation simply by pulling a lever. This is mechanically linked to two valves and electrically linked to a Newbery control mounted on top of the machine. Sluicing is carried out automatically for any period up to 20 minutes, via a dial selector. While the cage rotates—six revolutions in each direction with pauses between directional changes—water builds up in the machine to a given point and then is completely syphoned out. This occurs every three minutes, although this period can be varied if required. Enlargement of a planned series of perforations in the inner cage ensures removal of solids.



The Forco " Autosluicer."

At the end of the sluicing period the water inlet valve automatically closes and the dump valve opens. After a pause for draining, the machine goes on to spin at 430 r.p.m.—believed to be higher speed than previously available—for four minutes and then " tumbles " the work to facilitate unloading. During the complete cycle a red light indicates that the unit is working.

The door of all Forco Auto Sluicing machines is electrically and mechanically interlocked when the machine is operating. It takes about 15 seconds to open the door and at the commencement of the door opening process, the water outlet valve automatically opens so that water is drained from the machine before it is possible to open the door.

Also available for connection to the " Autosluicer " is a tank/pump unit which automatically injects bactericide into the load. If such additions are made by hand the solution is poured into a hopper fitted to the machine and snap-locked against splash-back.

The range is constructed to industrial standards throughout, simple in design yet robust. Substantial bearings support the cage from the rear so that no frontal support is necessary. The roller bearings are completely sealed from the cage and intermediate traps supply additional " insurance " protection.

The " Autosluicer " has a toughened glass " porthole " with a substantial seal which is impervious to additives. The door is fitted with an electrical safety interlock which brings the machine to a stop should it be opened during operation. It is designed for a three-phase electrical supply and the only other connections are to a cold water supply and a drain.

Brief Specification:

Model 12X

H.P. 1; Weight 3½ cwt.; Floor space 2′ 0″ × 2′ 0″; Wash speed 52 r.p.m.; Extract speed 430 r.p.m.; Water: Inlet ¾″, Outlet 2″.

Model 24X

H.P. 1½; Weight 4½ cwt.; Floor space 2′ 0″ × 2′ 6″; Wash speed 48 r.p.m.; Extract speed 410 r.p.m.; Water: Inlet 1″, Outlet 2″.

Model 35X

H.P. 2½; Weight 12 cwt.; Floor space 2′6″ × 2′ 8″; Wash speed 45 r.p.m.; Extract speed 360 r.p.m.; Water: Inlet 1″, Outlet 2″.

BRAITHWAITE PURCHASE GRIMSLEY & CO.

It is announced that Messrs. Isaac Braithwaite & Son Ltd., manufacturers of " Ibis " Laundry and Dry Cleaning Machinery, and " Hoffman " Knitwear and Clothing Presses, have purchased the business of Grimsley & Co. (Leicester) Ltd., St. George's Engineering Works, Conduit Street, Leicester.

The business will retain the original name of Grimsley and continue the manufacture of the Rapid Automatic Knitwear Press and other machines. Messrs. Braithwaite state that the purpose of this co-operation is to meet the increasing demand for the products of both companies and, by certain rationalisation, provide more capacity.

On the Market

A review of new equipment and materials and their development

AUTOMATIC BOILER LOADING BY NEW CONVEYOR

The provision of adequate and efficient means for the feeding of boilers is always of great importance.

A new type of mechanical conveyor is now available which, because it requires the minimum of space can be readily incorporated into many existing boiler houses.

An interesting installation at a large block of flats has simplified and speeded up the loading of the boilers which provide central heating.

The Ideal Britannia 4K/Series boilers were fitted with an Earlymil attachment and an automatic stoking device some time ago. However, it has still been necessary for the boilers to be hand loaded. This has now been obviated by the provision of a 21 ft. Mayrath Conveyor which has been mounted on a rail attached to the roof of the boiler house to provide a means of moving it from one boiler to another.

Bulk deliveries of anthracite grains are made through the pavement in the normal way. The screw of the conveyor is inserted in the anthracite. When this is revolved by the action of the motor mounted at the head of the tube, anthracite is carried up the tube and, reaching the top, it falls into the hopper for direct feeding to the boiler by means of a hand operated slide valve.

The Mayrath Conveyors are supplied exclusively by **Gordon Felber & Co. Ltd.**, Oxford Circus, London, W.1.

They consist of a 6 in. diameter one piece galvanised metal tube which carries inside it a rotating Archimedes type screw. This is driven by an electric motor or petrol engine which is fitted either at the head of the conveyor or on a special mounting on a carriage.

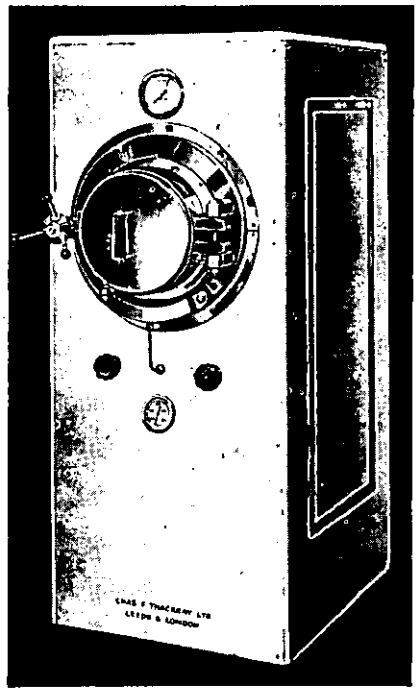
Capable of dealing with quantities of 30–40 tons an hour or 38–40 cubic feet per minute depending upon the fuel involved, the angle of use and rate of feed, five models of the new conveyor are available, each designed to meet a specific need. Prices range from £45 upwards exclusive of motor.

NEW THACKRAY HORIZONTAL AUTOCLAVE

A new horizontal autoclave has been introduced by **Chas. F. Thackray Ltd.** intended mainly as a replacement of existing boiling type sterilisers for utensils and instruments, and it is easily installed in a ward or theatre where a mains steam supply at 50 p.s.i. is available. Electrically heated models are also available.

Designed for a working pressure of 32 p.s.i. at 278° F., the steriliser is operated by two valves, one to admit steam to the chamber for sterilising and the other to evacuate after sterilising. High pressure steam enters the unjacketed chamber at the top and replaces the air by downward displacement through

The Mayrath Conveyor to simplify and speed up the loading of the boilers.



The new Thackray Horizontal Autoclave.

a thermostatic steam trap. Sterilisation is said usually to take four minutes.

The chamber, of internal dimensions 12 ins. dia. by 20 ins. long, is made of copper by welded construction, is internally tinned and is securely rivetted to a gun-metal head-ring which carries the door. It is lagged and covered with a satin finished stainless steel cladding. The unit is available as two models, either free standing mounted on a tubular steel stand, or totally enclosed in a white stove-enamelled steel cabinet.

The door of gun-metal is closed by means of a shackle bolt and capstan wheel, and the closing mechanism can not be fully released until the chamber is completely vented to atmosphere. Exterior fittings include a safety relief valve, a thermostatic steam trap with check valve and a pressure gauge.

The semi-circular basket is designed to hold small bowls and utensils, and is suitably mounted with a shelf on top to hold a perforated stainless steel instrument tray.

DEXION FOR BALKAN BEAMS

Balkan beams, designed to the exact size of the bed where they are needed, are in use at the New Princess Margaret Hospital, Dar Es Salaam, Tanganyika.

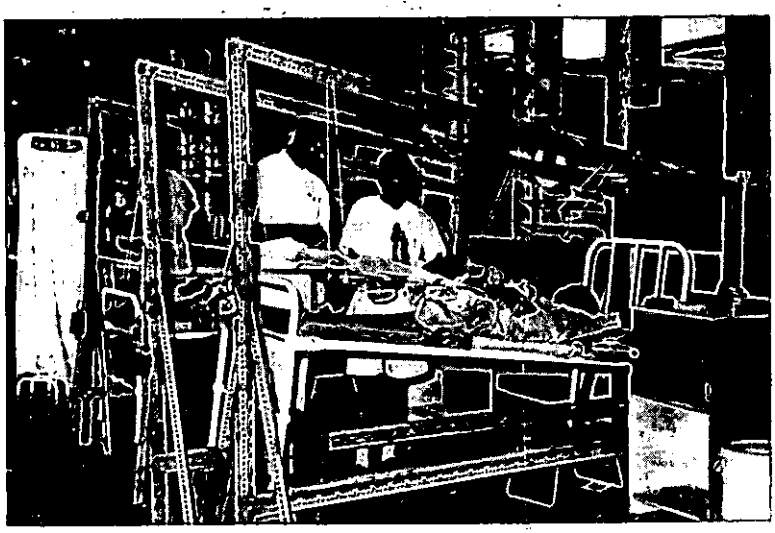
The beams were designed by the local Dexion distributor and built by the hospital staff after buying their supplies from the Government stores.

Dexion is already widely used by hospitals in Britain for remedial exercise equipment, laboratory rigs and general storage.

One advantage, from the hospital point of view, is that it can be bought in standard size packets and stored for immediate use when needed. After dismantling it can be restored and used again.

NEW MANLOVE GLOVE PROCESSING PLANT

Since it is becoming increasingly apparent that a central supply service is essential to efficient operation of hospitals, **Manlove, Alliott & Co. Ltd.** have taken steps to add glove processing equipment to that already offered for use in Central Sterile Supply Departments.



Dexion Balkan Beams at Princess Margaret Hospital, Dar Es Salaam.

The three units forming the new Manlove, Alliott glove processing plant are very convenient as regards siting.

" Rotary " glove processing equipment consists of separate single purpose machines designed for automatic

(*a*) washing,
(*b*) drying,
(*c*) powdering.

A load of 150 gloves can be thoroughly washed in twenty-eight minutes and subsequently dried and powdered.

Surplus powder is collected and re-used and each glove receives an even coating of powder inside and outside without turning and with no accumulation in the fingertips.

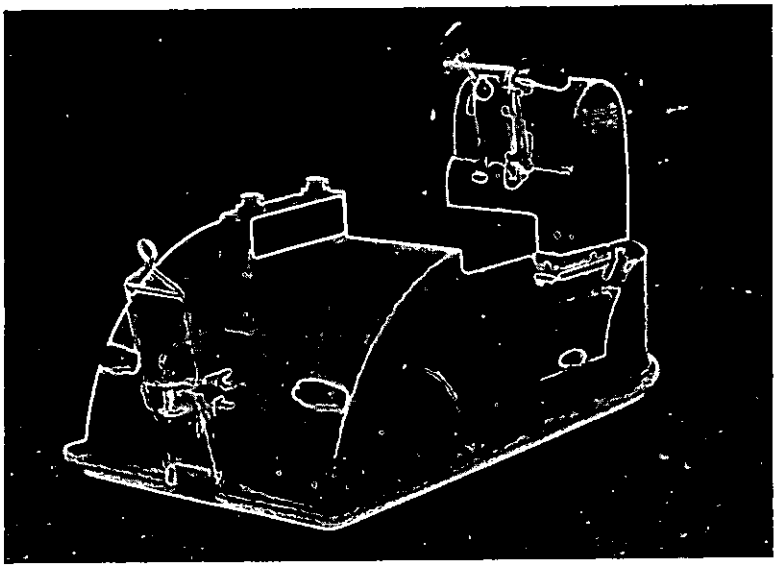
A central glove processing department can be sited in a space 8 ft. 6 ins. square but the equipment is also adaptable to any available area or shape.

No permanent connections are necessary and washer hose may be temporarily connected to adjacent hot and cold water taps. Drain line will also discharge into any adjacent sink.

THE " WRIGLEY " HOSPITAL TUG

Wessex Industries Ltd. of Poole, Dorset, have recently made up for Guy's Hospital a special small battery electric tug which is arranged for driver control and to be extremely manoeuvrable in confined spaces. Similar equipment has been supplied to other hospitals.

As can be seen from our illustration, the truck which is finished all in white, is enclosed in a sheet steel cowling with a heavy white rubber bumper round the lower edge of the chassis and bodywork. It also has two-passenger foam rubber seating, a special spring-loaded hinged rear hitch, electric gong,

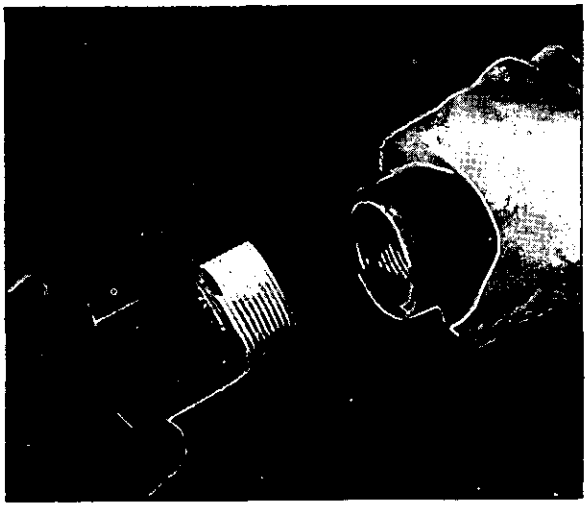


The " Wrigley " Tug supplied to Guy's Hospital.

side and rear lighting and a flashing towing indicator behind the driver.

The motor is a 24 volt C.A.V. traction type giving a speed of approximately 2,000 r.p.m. maximum and is fitted with an Albion 3-speed and reverse gearbox with hand operated clutch. Transmission is by chain to 16-in. ×4-in. heavy duty Dunlop tyres and wheels. Braking is 6-in. Girling internal expanding with hand lever control. There is a two stage foot-operated mechanical controller and handle-bar steering gives 90° of turn to either side. Batteries are Exide Ironclad 110 amp. hr. capacity traction type with charger socket for instant connection, and suitable safety devices.

Various other models are available.



" Thredseal " applied to a thread prior to screwing home.

A NEW METHOD FOR THREADED CONNECTIONS

A new material for sealing threaded pipe joints known as " Thredseal " tape has been introduced earlier this year by **Crane Packing Ltd.** It is supplied in spools containing 40 ft. of ½ in. wide tape and it is necessary only to cut off a sufficient length of the tape to wrap round the thread, allowing for an overlap of approximately ½ in., and the thread is then screwed home. The tape should be pulled taut so that it grips and sinks into the thread.

The material is self-lubricating and can be used on threads of virtually any material, even those imperfectly formed. As it never hardens, there should be little difficulty in breaking joints after long periods. It can be used to seal pressures of several thousand pounds and temperatures of —200° F. to + 500° F.

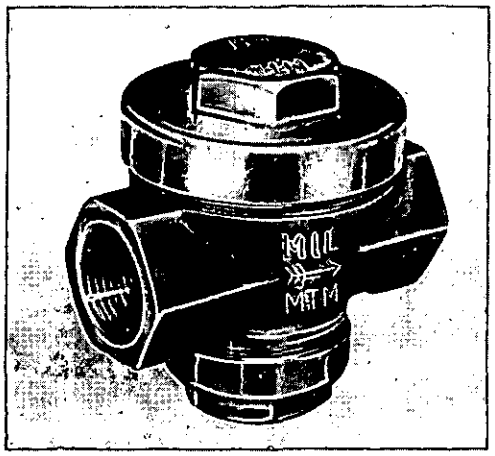
The tape, made from PTFE which is a chemically inert material, can be used for most corrosive fluids where required and, being non-toxic, it does not contaminate the fluid with which it is brought into contact.

Sufficient for some 120 joints on a one inch pipe, the cost of a roll works out at slightly less than 1½d. per joint.

A NEW MIL STEAM TRAP

The new " MilTherMatic " steam trap is the latest addition to **Midland Industries** rapidly expanding range of equipment.

Six components form the complete trap, with only one moving part—the valve. The bodies are either manganese bronze forgings or stainless steel castings and the internal trim is in stainless steel.



The new " MilTherMatic " Steam Trap.

The trap is suitable for pressures from 5 to 150 p.s.i. with the manganese bronze body, or from 5 to 400 p.s.i. with the stainless steel body, and is available in ½ in. and ¾ in. sizes screwed B.S.P. or A.N.P. threads.

NEW FLUORESCENT FITTING

General Illuminations Co. Ltd., of 142, Grand Buildings, Trafalgar Square, London, W.C.2, have recently produced a new twin 4-ft. fluorescent fitting which is intended for use as a general Ward lighting unit. The fitting was manufactured to the design of Messrs. Watkins Gray and Partners and will be used in the Wards of the new Surgical Block at Guy's Hospital..

By using an open type of internal reflector, maximum downward and upward light is achieved, there being no light losses by transmission. Also, due to the angle of the louvre and the sides of the fitting, dust collecting surfaces are reduced to the minimum. An emergency light can be incorporated in the fitting if required and the fitting can be supplied finished in any British Standard colour.

Bookshelf

THE HOSPITALS YEAR BOOK, 1961. The Institute of Hospital Administrators, 75, Portland Place, London, W.1. 9½ ins. × 6 ins., 1,195 pp.

The new edition has undergone a thorough revision planned to ensure that the Year Book will continue to provide up-to-date and authoritative information. Sections provide details of bed and patient statistics, hospital finance, government departments and statutory bodies, organisations concerned with hospital and health services, local health authorities, executive councils, the N.H.S. Whitley Councils, and hospital contributory and provident schemes. The substantial reference section includes notes on legal, technical and general subjects, as well as detailed indexes to statutory instruments and official circulars, summaries of reports, and a short bibliography of hospital literature. As in previous years the final section consists of a comprehensive guide to hospital purchasing.

In his annual article the Editor (Mr. J. F. Milne) draws attention to some fundamental differences between the English Mental Health Act of 1959 and the subsequent Mental Health Act for Scotland. He also comments on the future development of hospital psychiatric services, on work study in the hospital service, and on hospital building.

Differences in Mental Health Legislation

Two major differences—reflecting "fundamental differences of outlook and principle"—between the Mental Health Act, 1959 and the Mental Health (Scotland) Act, 1960 are noted. First, whereas in England and Wales the Board of Control has been abolished, in Scotland protective and inspectional functions will continue to be exercised by a quasi-independent body, the Mental Welfare Commission. Secondly, in England and Wales a judicial order is now no longer required before the compulsory removal to and detention in hospital of a patient can be effective, but in Scotland any such removal and detention will require the approval of the Sheriff.

It is not readily understandable, says the Editor "that the same legislative assembly should overwhelmingly accept in 1959 that in England and Wales there was no longer any necessity for a quasi-independent body to exercise oversight of the care and welfare of mentally disordered patients or for the intervention of a magistrate to protect the liberty of the subject, but within a period of months reach a quite different decision on both these matters in respect of Scotland."

Efficiency and Work Study

The increase in the volume of hospital work which has taken place since 1948, and is still continuing, represents a significant achievement, but it has become increasingly evident that to secure the most efficient and economical use of resources the hospital service must seek to make the utmost use of modern techniques of management, including, in particular, work study. The current expansion of work study in the service is welcomed, but it is added that "those who expect to see spectacular financial savings result from it are likely to be disappointed." While savings will be produced in certain directions, the result of work study in some other directions will undoubtedly be to bring to light deficiencies whose remedy will call for increased rather than decreased expenditure. "What has to be looked for from the development of work study is essentially increased efficiency of operative rather than financial savings."

Hospital Building

Despite the expansion of the hospital building programme the amount available for capital expenditure is still grossly inadequate. As, however, more money becomes available for capital works it becomes the more important that the service should be in a position to use it to maximum advantage. There is need for more work to be done on the problem of assessing future hospital needs; for more study of hospital design problems and for a wider discrimination of the results of such study and of experience both at home and abroad; and to cut down the present "ludicrously long" time now taken to bring a hospital project from conception to completion "those working in the service must accept some measure of standardisation of design and also of standard costing."

ROAD VEHICLE LUBRICATION

"Road Vehicle Lubrication" is the title of a 76 page handbook just published by Wakefield-Dick Industrial Oils Ltd., a member of the Castrol Group of Companies.

Although bearing the same name as an earlier book last printed in 1956, "Road Vehicle Lubrication" is, in fact, virtually a new publication. Both text and illustrations, of which there are 50, have been extensively revised and brought up-to-date and the book has been re-set in a new format.

"Road Vehicle Lubrication" offers a comprehensive guide to the commercial operator of both passenger and goods vehicles on the proper lubrication maintenance of engine, transmission and final drive. There are also chapters on chassis lubrication, the effects of faulty lubrication and equipment and oil storage.

Copies are available to readers of this journal, free on request to Wakefield-Dick Industrial Oils Ltd., Castrol House, Marylebone Road, London, N.W.1.

REPORT ON THE METRIC SYSTEM

"Decimal Thinking should be Encouraged"

The report* was published last month of a two-year investigation by the British Association for the Advancement of Science and the Association of British Chambers of Commerce, into the desirability, practicability and likely costs of introducing a decimal coinage and/or a metric system of weights and measures in this country.

It was a comprehensive investigation to which some 2,000 organisations—individual firms, trade associations, professional institutions, the B.S.I. and many others—contributed their views.

On the subject of a decimal coinage the report says there is a strong case for its adoption in Britain. The government are urged to take an early decision in principle, one way or the other.

Metric System

It is the second part of the report—that dealing with a metric system of weights and measures—in which readers and industry in general will be specially interested. The committees which drew up the report were unable to recommend any compulsory changeover to the metric system in the immediate future because the benefits appeared to be small and outweighed by the extremely high transitional costs, particularly in engineering. However, says the report, practice in the use of the metric system and decimal thinking should be encouraged to enable the United Kingdom to keep abreast of the world trend.

* *Decimal Coinage and the Metric System: Should Britain Change?* (Butterworth's Scientific Publications. 7s. 6d.)

Notes for Members

News of I.H.E. activities, etc., and items of interest from Branches

OBITUARY

Mr. G. H. Siers

We regret to announce the death of Mr. George Harding Siers on October 26th, 1960, at the age of 72.

Having been engaged in the construction of the Children's Hospital, Birmingham, Mr. Siers joined the staff as Chief Engineer upon its completion in 1914. In 1917, however, he was appointed to Birmingham General Hospital, subsequently becoming Chief Engineer and where he remained until his retirement on sick pension in 1952. He was elected a Member of the Institution in 1946.

Mr. Siers was a member of the Advisory Committee of Birmingham Technical College from 1934 to 1937, and sometime City and Guilds examiner.

WEST OF ENGLAND BRANCH

A meeting was held at Barrow Hospital, near Bristol, on October 15th.

The Chairman opened the proceedings by introducing Mr. G. Hopper, Senior District Health Inspector, who gave an informal talk entitled "Implementation of the Clean Air Act and Smoke Abatement." Mr. Hopper pointed out that hospitals, being Crown property, were in a position where the law could not be enforced upon them, but most hospital engineers realised the wisdom of following the principles set down in the Clean Air Act, not only on the grounds of efficient running of boiler plant, but for the good of the community as a whole. The maximum permissible limits of smoke were given, and Mr. Hopper showed his audience a small optical smoke viewer, developed in conjunction with the D.S.I.R., which was simpler to use than the conventional Ringelmann charts. It was learnt with interest that no legal proceedings had, as yet, been necessary, all parties approached having shown willingness to co-operate with the smoke inspectors in following the recommendations of the Act.

Mr. Hopper referred briefly to the procedure to be followed in asking the local planning authority to approve plans when submitting details of chimney stacks. It was necessary to satisfy the planning authority that the height of discharge was sufficient to ensure proper dispersal of flue gases clear of surrounding ground and buildings.

Members were told of the local authority's power to give financial assistance to domestic users who had to replace unsuitable grates in order to comply with the Act. Up to seven-tenths of the cost of alterations could be granted to domestic users, but no grant could be made to industrial consumers.

During the discussion which followed, members were reminded that all incinerator installations were subject to the Act and, if necessary, dust catchers and after-burners should be included.

Mr. W. L. Williams reported progress regarding the proposed artisan course and said that lectures could be held on Thursday evenings at the Regional Board's offices subject to the attendance being limited to the accommodation available. The possibility of repeating the course at Exeter was raised and Mr. Williams was asked to undertake the necessary arrangements for this area.

The Chairman expressed his pleasure at the success of the joint meeting held with the Institute of Plant Engineers on October 12th.

The Chairman read a report of the Council meeting held on July 22nd and Mr. Adams added details of the latest Whitley Council activities. At this juncture the Chairman expressed the appreciation of members of the West of England Branch for the work done on their behalf by Members of Council.

The appointment of a maintenance officer in a Group in the South West Region was discussed and it was understood that this officer was on the staff of the Group Secretary. The question of which administrative grade this officer had been placed in was raised and it was decided that further investigation was required.

EDINBURGH BRANCH

A meeting of the Branch was held on September 30th, 1960, at Leith Hospital. It had been necessary to postpone this from September 2nd, the date originally fixed.

Mr. W. Guthrie said that the Joint Scottish Branches' Weekend School had been very successful and regretted that more members of this Branch had not attended. Several members said that they had been unable to go because of the difficulty of arranging leave for those engineers in smaller hospitals. Mr. Guthrie replied that Boards of Governors were under an obligation to grant reasonable conference leave and arrangements for "reliefs" could be made in the same way as for holidays.

A report upon the July Council Meeting was given and the proceedings discussed in detail.

Arrangements for lectures and visits for the early part of 1961 were discussed.

MID-SCOTLAND BRANCH

The Branch held a meeting at Arbroath Infirmary on October 15th.

Prior to the opening of the meeting, members made a tour of the new oil-fired Boiler House, the new Out-patients Department and the new Physiotherapy Department and Maternity Wards.

Last year the specification and design of the new Boiler House was the subject of a talk and discussion at a meeting and it was the more interesting, therefore, to see the plant almost completed.

The meeting was confined to business matters.

YORKSHIRE BRANCH

A meeting of the Branch was held on November 12th at the General Infirmary, Leeds.

The Chairman introduced Dr. F. M. Parsons who addressed the Meeting, his subject being "The Artificial Kidney." Before doing so, however, Dr. Parsons took Members to visit the unit to inspect the actual machine. He then discussed it and its use in some detail and paid a tribute to the assistance that he had received from the Engineering Department for the help that had been given in setting the machine up.

Mr. Lewis gave a report upon the October Council Meeting and this was then discussed.

A member asked that "Refuse Disposal" should be made the subject of a discussion at a meeting in the New Year.

SOUTH WALES BRANCH

A Meeting of the Branch was held on November 12th at the Temple of Peace and Health, Cardiff.

The Agenda was confined to business matters which included the election of Officers for the ensuing year.

The Hon. Secretary reported that its Weekend School had proved fully self-supporting financially and a vote of thanks was moved in appreciation of his work.

Finally, the Meeting was addressed by the Chairman of the Institution, Mr. H. A. Adams, who gave an account of negotiations in progress and the preparation of a scheme for training young hospital engineers which would enable them to qualify for a nationally recognised certificate. He said that it was most important that the questionnaire being sent to all engineers should be completed as fully as possible.

WHITLEY COUNCIL

A meeting of the Full General Council was held on Monday, October 24th, 1960, at 14, Russell Square, London, W.C.1.

The principal items discussed were as follows:—

Election of Chairman and Vice-Chairman

It being the turn of the Staff Side to hold the Chairmanship, Mr. Ben Smith, Chairman of the Staff Side, was unanimously elected Chairman for the succeeding twelve months. The Hon. Sir Arthur Howard, Chairman of the Management Side, was unanimously elected Vice-Chairman.

Management Side and Joint Secretary

The Vice-Chairman, as Chairman of the Management Side, announced that Mr. T. E. Dutton was at that meeting relinquishing the post of Management Side Secretary and Joint Secretary of the Council on taking up other duties at the Ministry. His successor as Management Side Secretary was Miss M. F. P. Boys, who was also unanimously elected Joint Secretary.

Warm appreciation of Mr. Dutton's contribution to the work of the Council was expressed from both sides of the Council and recorded in the minutes.

Meal Allowances

The Council agreed to set up a small joint committee to give further consideration to the question of meals allowances for officers required to work late on which the two sides had so far failed to reach agreement.

London Weighting

The Council had before it a Staff Side claim for revision of the London Weighting amounts payable. The Management Side said they were unable to consider the matter since they felt it was more appropriate that as concerning remuneration, it should be dealt with by the various Functional Councils concerned. In noting this reply the Staff Side said that as London Weighting was a question which concerned all Functional Councils, they had hoped that the Management Side would feel able to join them in a recommendation. It would, however, now be open to the Staff Side of any Functional Council to raise the question as it thought fit.

Disciplinary Procedure

The Management Side said they were still not yet in a position to discuss the Staff Side memorandum embodying suggestions for improvements in the code of disciplinary procedure.

Staff Side Meeting

The same Staff Side members were present as at the Full Council meeting, with the addition of Miss A. Wood (Nurses and Midwives Council).

Besides the matters before the Full Council, the Staff Side, at a meeting earlier in the day, re-elected Mr. Ben Smith as Staff Side Chairman and Mr. S. R. Speller as Staff Side Secretary.

STOP PRESS

SITUATIONS VACANT

WILTSHIRE COUNTY COUNCIL
WELFARE SERVICES

Applications are invited from suitably qualified and experienced persons for the appointment of ENGINEER (non-resident) at Meyrick Close, Salisbury, to be responsible for the efficient working and maintenance of boiler house plant, heating apparatus, electrical installations and cooking equipment. All minor plumbing work is also undertaken by the engineering staff which, in addition to the Engineer, includes an Assistant Engineer and four Stokers.

Salary in accordance with P.T.B. Scales £780 × £25 (1) × £30 (4) to £925 per annum.

Normal working week, 44 hours.

The appointment is superannuable, subject to medical examination and terminable by one month's notice on either side.

Forms from Clerk of the County Council, County Hall, Trowbridge.

R. P. HARRIES,
Clerk of the Council.

KING EDWARD VII MEMORIAL CHEST HOSPITAL, HERTFORD HILL, NR. WARWICK
(224 beds)

SENIOR ENGINEER required. Salary scale £670—£805 (scale will be subject to improvement shortly). Person appointed will be responsible to Superintendent Engineer for maintenance of engineering equipment and building fabric. Applicants should hold one of the approved qualifications, have served a recognised engineering apprenticeship and had sound experience in maintenance and operation of steam boiler plant, electrical equipment, heating and hot water supplies, etc. Post resident—house available at appropriate rent.

Applications with names of three referees to Group Secretary, 50, Holly Walk, Leamington Spa, by 16th January, 1961.

SUFFOLK MENTAL HOSPITALS MANAGEMENT COMMITTEE
SUPERINTENDENT ENGINEER

Applications are invited for the above post from engineers qualified in accordance with the National Health Service Whitley Council regulations. Salary scale: 40½—50 points. In addition to general maintenance, work includes planning and supervision of minor building and estate works for two hospitals, site generation of electricity, waterworks and sewage works. Unfurnished house provided, present rent £57 10s., garage £10 p.a., plus rates £26 7s. 4d. p.a. Applications on form to be obtained from the Group Secretary, St. Audry's Hospital, Melton, Woodbridge, Suffolk.

CHESTERFIELD HOSPITAL MANAGEMENT COMMITTEE

Applications are invited for the post of SENIOR ENGINEER at Scarsdale Hospital, Chesterfield, required 1st April, 1961.

The person appointed will be responsible, under the Superintendent Engineer, for the care and maintenance of high pressure steam boiler plant, and mechanical and electrical services.

Candidates must have completed a thorough practical engineering training and be in possession of suitable qualifications.

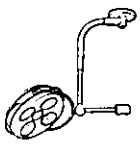
Salary scale £715 x £25(2) x £30(3) to £855 per annum (subject to points grouping being unchanged at 31.12.60).

Applications, giving full details of experience, engineering and building qualifications, etc., and names and addresses of three referees, must be submitted to the undersigned by 31st January, 1961. M. H. BOONE, Group Secretary.

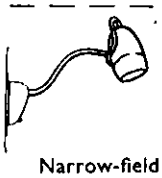
HANAU LAMPS for every purpose

Floor standing lamps for clinics and consulting rooms

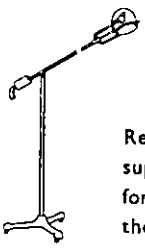
In addition to the famous 'Hanaulux' major operating lamps there is a complete range of smaller lamps for every purpose



Medium size lamp for minor operations

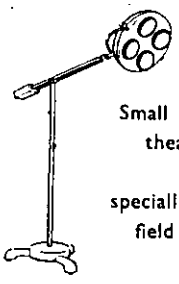


Narrow-field lamp. Floor standing and wall mounted models available

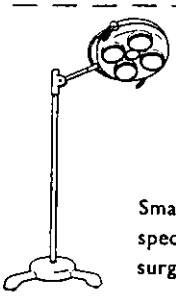


Remote control supplementary lamp for operating theatres

Ceiling-suspended examination lamp. Also suitable for minor surgery



Small operating theatre lamp giving a specially narrow field for deep cavities



Small lamp for specialists or minor surgery

SIEREX LTD

Write or telephone today for details

241 Tottenham Court Road London W.1 Telephone: LANgham 2464

PHILIPS APPOINTMENTS

The following appointments are announced by the Midlands Region of Philips Electrical Ltd.

Mr. C. Pitcher and Mr. G. H. Barton to be sales engineers attached to Nottingham Branch.

Mr. J. E. Little-Jones to take over lamp and lighting representation in the Leicestershire territory at present covered by Mr. Pitcher.

Mr. D. J. Langton to take over the area previously covered by Mr. Barton.

Mr. C. Blythe to take over lamp and lighting representation in North Nottinghamshire and North Derbyshire.

Three new appointments are announced by the South-East Region of Philips Electrical Ltd.

Mr. A. G. Brown has been appointed a lighting engineer.

Mr. R. C. Mercer to be manager of the Regional Street Lighting Department.

Mr. R. Pitteway to be area manager in place of Mr. Mercer.

CLASSIFIED ADVERTISEMENTS

SITUATIONS VACANT

KING EDWARD'S SCHOOL
Witley, Nr. Godalming, Surrey

ASSISTANT ENGINEER

required at co-educational boarding school.

Must be a qualified electrician and experienced in the running of oil-fired plant. Knowledge of institution maintenance work and kitchen plant an advantage.

Cottage available.

Salary £590 p.a. rising to £620 p.a. Contributory superannuation scheme.

Apply giving full details of age, experience, etc. to The Bursar.

SOUTH-EAST METROPOLITAN REGIONAL HOSPITAL BOARD

Applications invited for the post of

ENGINEERING DRAUGHTSMAN (Electrical).

Salary within the range of £570-£1,300 according to experience and qualifications. Preference will be given to candidates who hold the Higher National Certificate in Electrical Engineering and have had suitable practical and theoretical training including site or workshop experience. Consideration will be given to experience as alternative to qualifications.

Applications stating age, qualifications, experience and present salary, with names of three referees, should reach the Secretary, 40, Eastbourne Terrace, W.2, by the 9th January, 1961.

LEEDS (GROUP B) HOSPITAL MANAGEMENT COMMITTEE

Vacancy for WORKS ASSISTANT (male) for Superintendent Engineer's Office at Seacroft Hospital. Duties will include making drawings and tracing, keeping records and returns, etc. Salary at 21 years £465 rising by annual increments to £690 p.a. Whitley Council conditions.

Applications with full details and names of two referees to Group Secretary, Seacroft Hospital, Leeds, 14.

MISCELLANEOUS

SUPERIOR QUALITY DIESEL GENERATING PLANTS

DORMAN DIESEL GENERATING PLANT
62½ KVA. 415/240/3/50

Dorman 6 cylinder radiator water cooled diesel engine direct coupled to a McFarlane alternator. 62½ kva. 415/240/3/50. ·8 P.F. 1,000 r.p.m. Comprehensive control panel. Fully metered. Automatic voltage regulation. The whole plant mounted on a substantial baseplate. 24v electric start. Manufactured 1954 and only used as a mains failure standby plant. Approximately 100 hrs. running only. In magnificent condition throughout and almost equal to new. £850.

McLAREN DIESEL GENERATING PLANT
62½ KVA. 440/3/50

McLaren 5 cylinder radiator water cooled diesel engine direct coupled to a Metro Vick alternator. 62½ kva. 440/3/50. ·8 P.F. 1,000 r.p.m. Mounted on baseplate. Control panel with automatic voltage regulation. 24v electric start. In excellent condition throughout. £750.

PETTER DIESEL GENERATING PLANT
125 KVA. 400/3/50

Petter twin cylinder water cooled diesel engine. 150 H.P. 500 r.p.m. Belt driving 125 kva alternator at 375 r.p.m. Compressed air start. Complete with petrol engine and compressor unit. This plant was installed and regularly maintained by the Manufacturers. Used only for mains failure purposes and in superb condition throughout. Full set of blue prints available for inspection. £1,250.

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TRANSLATIONS

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