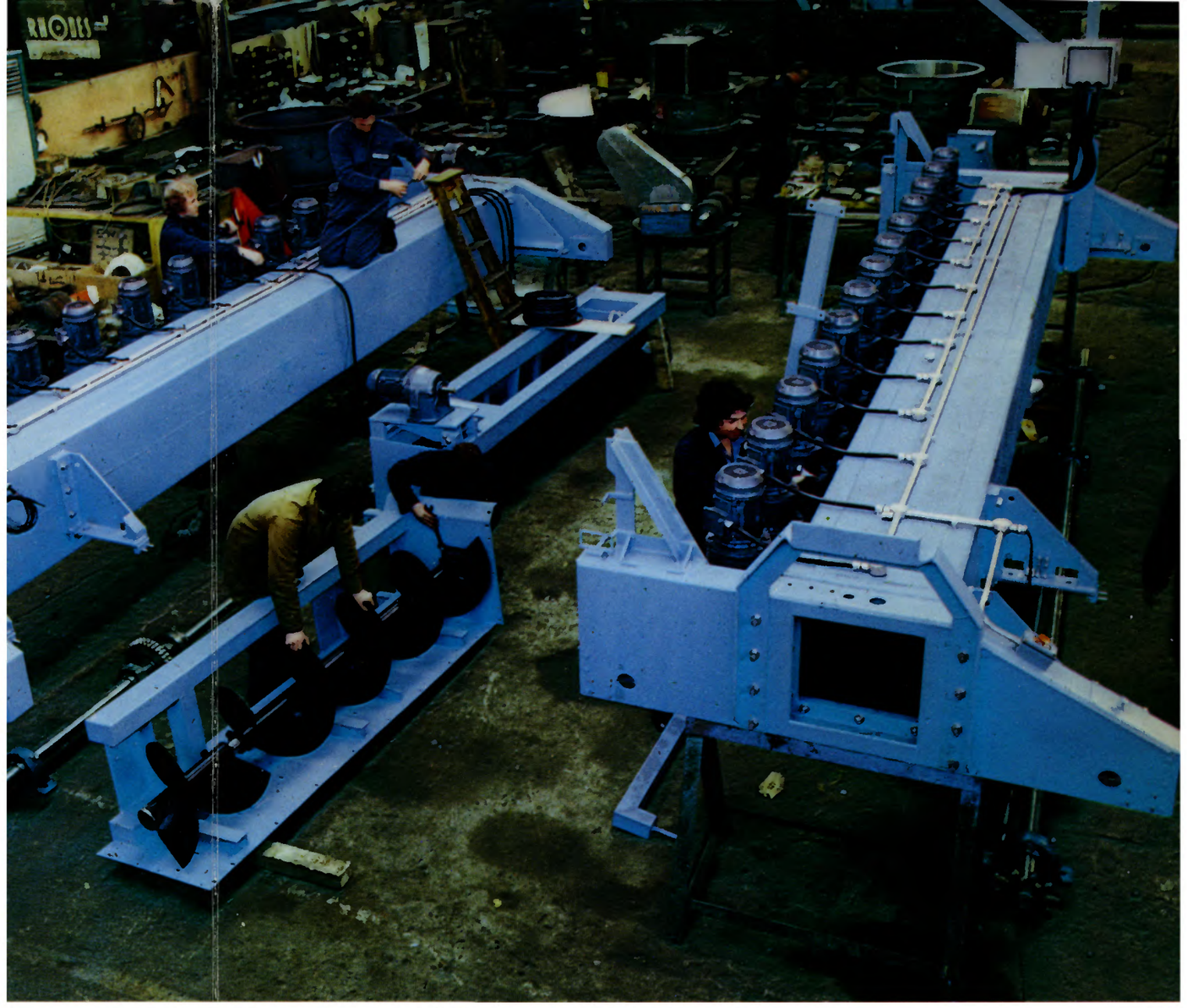
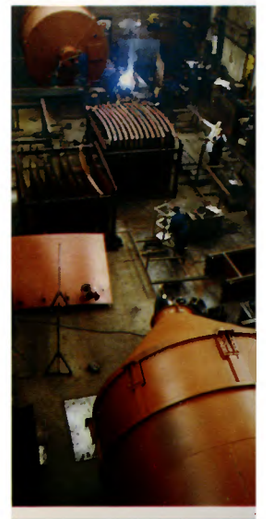
REDLER®

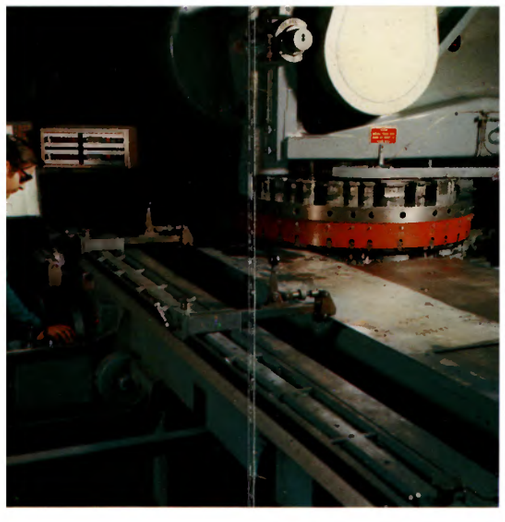
Process Plant for the Malting Industry

Below:
Any new malting plant project should start with a feasibility study and investigation of the technical and economic viability of the scheme. When the proposals have been accepted, Redler are able to take full responsibility in the implementation of the project through all stages of planning, manufacture, construction, and commissioning.

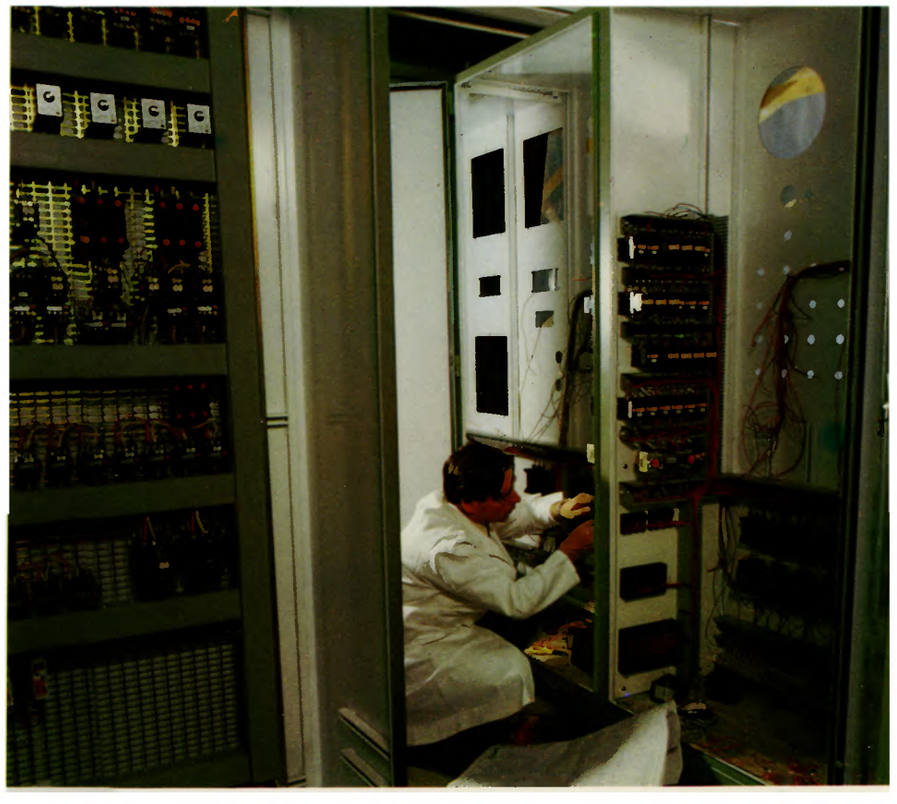


Below:
Steeps, bins and other sheet metal components are fabricated in our factory using advanced welding equipment.

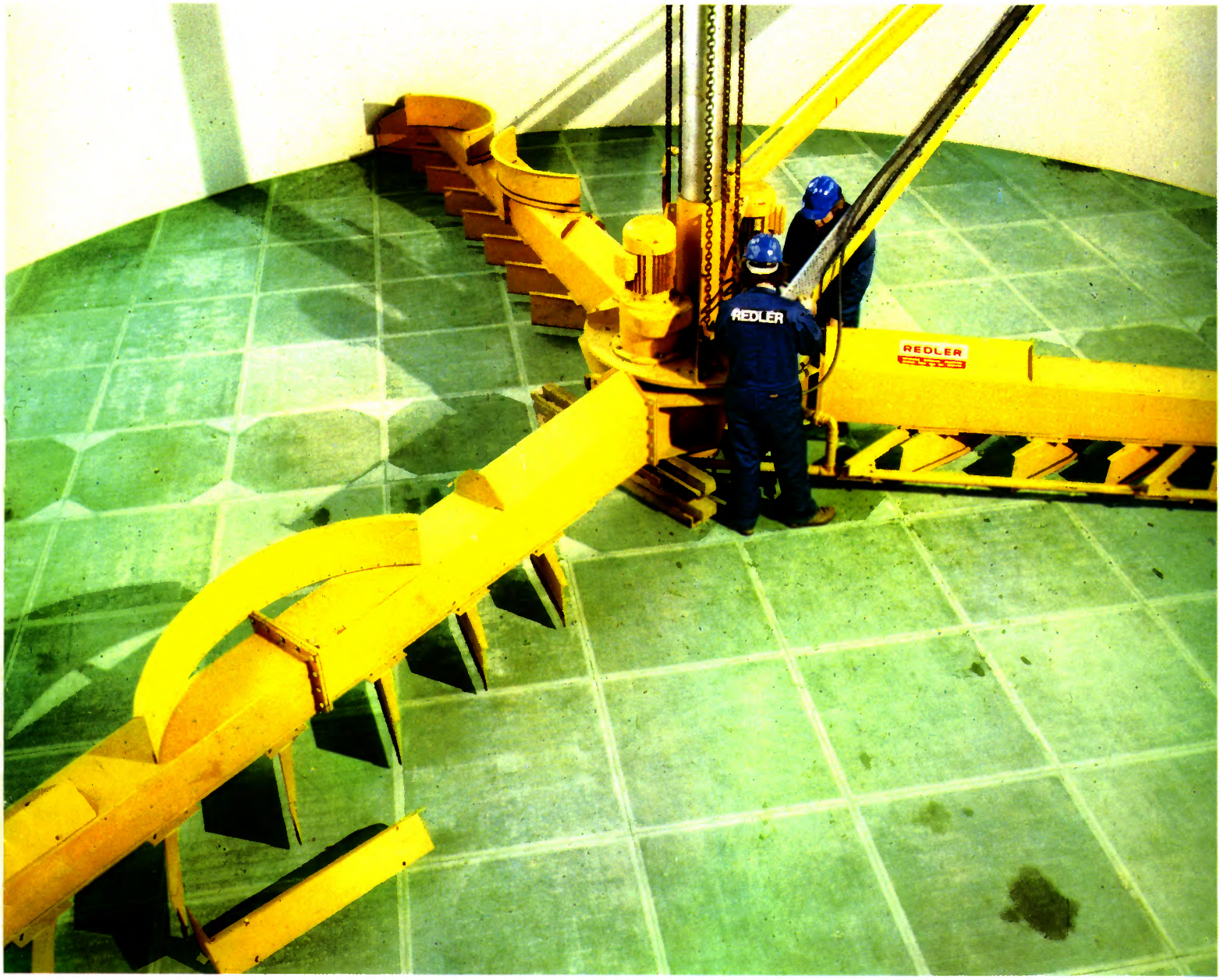


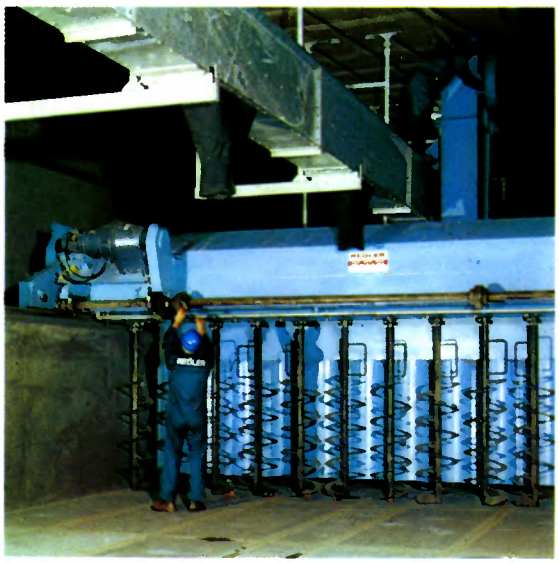


Left, Above and Top Centre:
The initial plant layout and final detail designs are produced in our drawing office. A high standard of quality control is maintained during factory production and finished components are built into full assemblies in our fitting shops to simplify site erection.



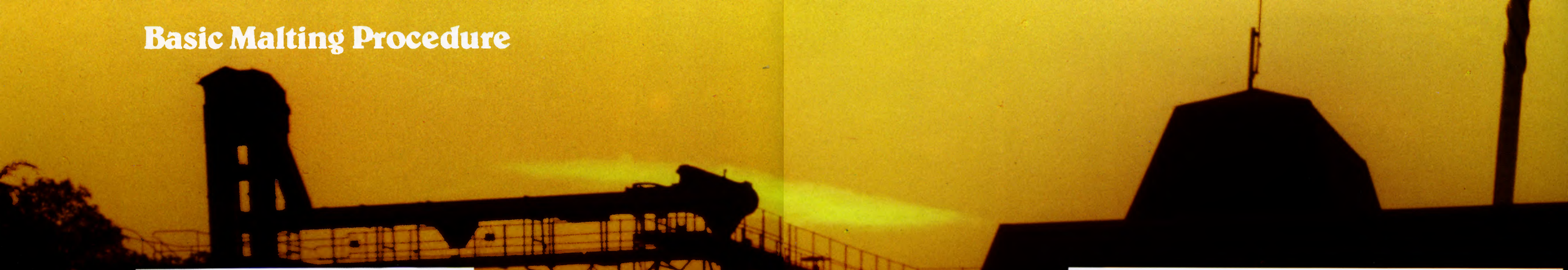
Left:
An important aspect of Redler total capability is the company's well equipped electrical department, where we design, build and test our own control panels.

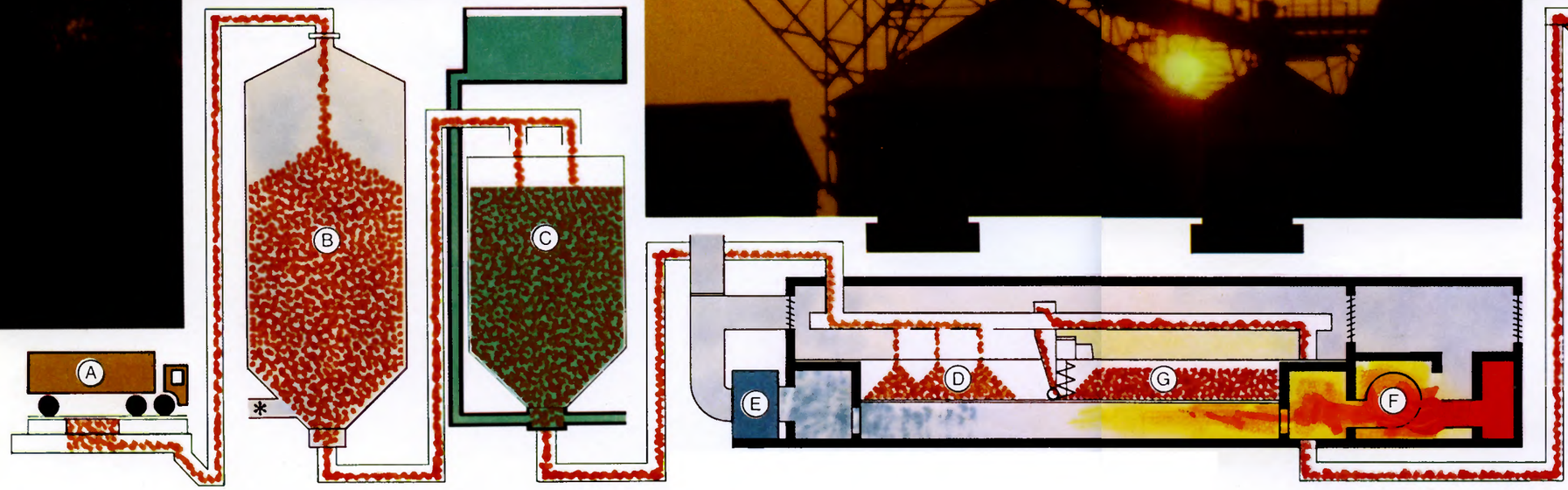




Top, Above and Left: Redler erection staff are fully experienced in the construction, installation and commissioning of malting plants, having successfully carried out such projects throughout the world.

Basic Malting Procedure





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Delivery

Designated varieties of barley conforming to a rigid specification are selected by maltsters directly from farmers and grain merchants. Consignments are delivered to maltings, particularly during the harvest period, mainly in bulk but sometimes in sacks.
After samples have been checked in the laboratory, the barley is weighed, rough screened and taken into storage. Barleys received direct from the farmer must often be dried to 12% moisture for satisfactory storing.

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Storage

The barley storage silo comprises nests of circular or rectangular bins which may be constructed in steel or concrete. Silos of this type are self discharging but occasionally flat bottom storage sheds are used, with portable augers to assist discharge.
Ventilation is often provided, to prevent heating up of the grain.

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Steeping

Steeping is the first stage of the malting process. Barley is extracted from storage, screened, weighed and transferred to steeping vessels, where water is added to raise the moisture content of the grain to 46%. During the steeping period, which lasts from 60 to 72 hours, the vessel is alternately flooded and drained. During immersion periods, the grain is periodically roused by means of compressed air and, during the dry periods, it is ventilated to remove CO^2 and to prevent excessive rise in temperature.

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Germination

The steeped barley is then transferred to the germination units for 3 to 5 days. During this period, when the grain is referred to as green malt, germination takes place and a rootlet forms at the end of the corn. Considerable heat is produced by the respiration of the barley and air conditioning is provided to maintain the temperature at 15 °C with 100% saturation, to maintain the moisture content of the grain. Turning is carried out at intervals, to prevent matting of the rootlets and to break up pockets of CO^2.

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Kilning

The final stage of the process, known as kilning, normally takes from 24 to 36 hours. At this stage, hot dry air is passed through the green malt, to reduce the moisture content from 46% to 3 or 4%. In the final stages of kilning, the temperature is increased to impart the required colour to the malt, this being an important factor in the final colour of the beer at the brewery.

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Screening

After kilning the malt is screened, to remove dust and the rootlets which formed during germination. These rootlets referred to as culm, are separated out as a useful by-product for the cattle feed industry.

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Storage

The malt is then transferred to the malt silo where it is stored in bins, similar to those in the barley store. The low moisture content of the malt at this stage requires that the bins be insulated.

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Despatch

Finally, the malt is extracted from the malt silo, weighed and transferred to overhead out-loading bins, ready for loading the bulk vehicles which deliver to the brewery.

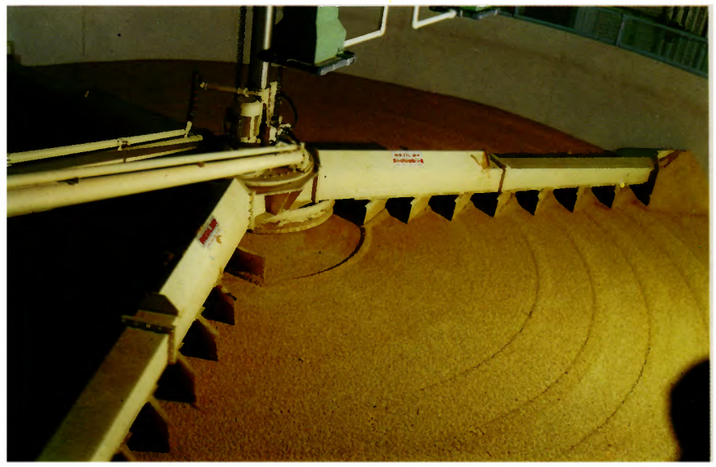
Conical and Flat Bottomed Steeps

For generations, steeps were simple vessels, generally of small capacity and capable of only the most basic filling, flooding and draining functions.

When Redler pioneered the conical ventilated steep, the scope for applying techniques within the steep suddenly increased. It is now possible to achieve partial germination through controlled forced ventilation and this has led to the design of more sophisticated steeps with high capacity ventilating systems and fast turn round times.

The most recent advance is the Redler flat bottomed steep, accommodating batches of up to 600 tonnes of barley and capable of extremely high ventilation rates.

Improvement follows improvement and Redler process and control system designers are currently developing even more advanced conical and flat bottomed steeps for the next generation of process plant.



Left:
Special ventilated type steeps.

Other illustrations:
Circular flat bottomed ventilated steeps.

Germination and Kilning Plant

Combining the two processes of germination and kilning within a single box represents another of the major advances introduced by Redler.

The development of this technique has now reached a high state of refinement. All the major operations are fully automated, manpower needs are reduced to a minimum and the control of the germinating and kilning cycles is electronically programmed to ensure the maintenance of the most critical quality standards.

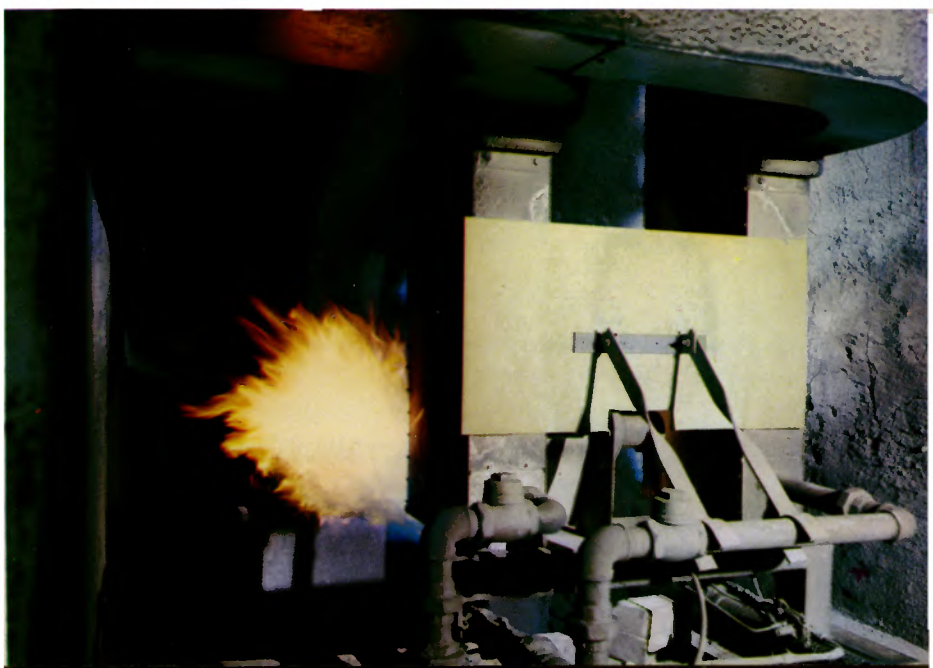
REDLER combined germinating-kilning boxes offer a further cost-saving bonus. Many of the components have been rationalised to a modular concept. This achieves a marked reduction in capital cost through more economical production yet retains complete flexibility of choice so far as box dimensions are concerned.

Left:
Loading a combined germinating kilning box.

Right:
Screw type box turner.

Bottom Left:
Gas fired malt kiln.

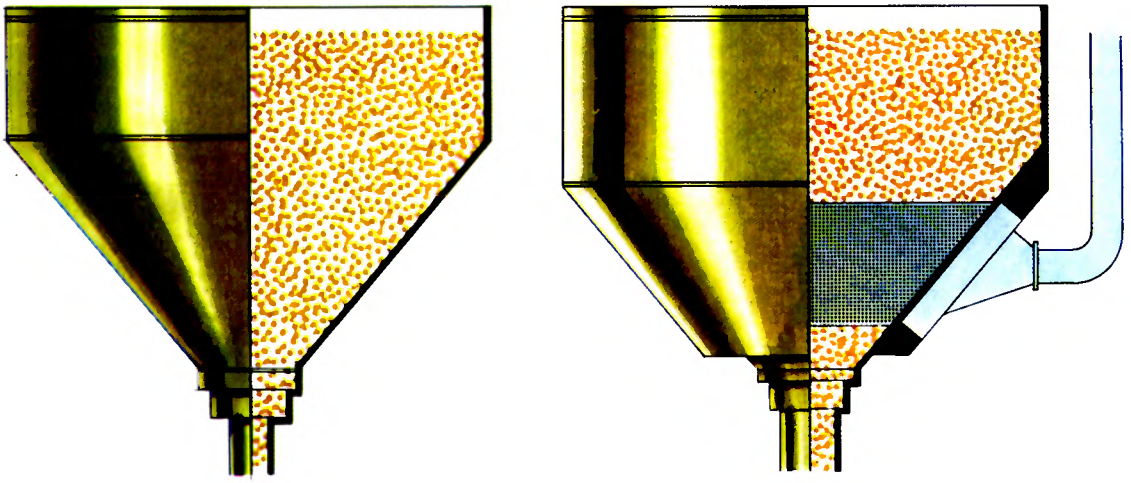
Bottom Right:
Holding bin for malt-in-culm.



Redler Malting Technology Guide

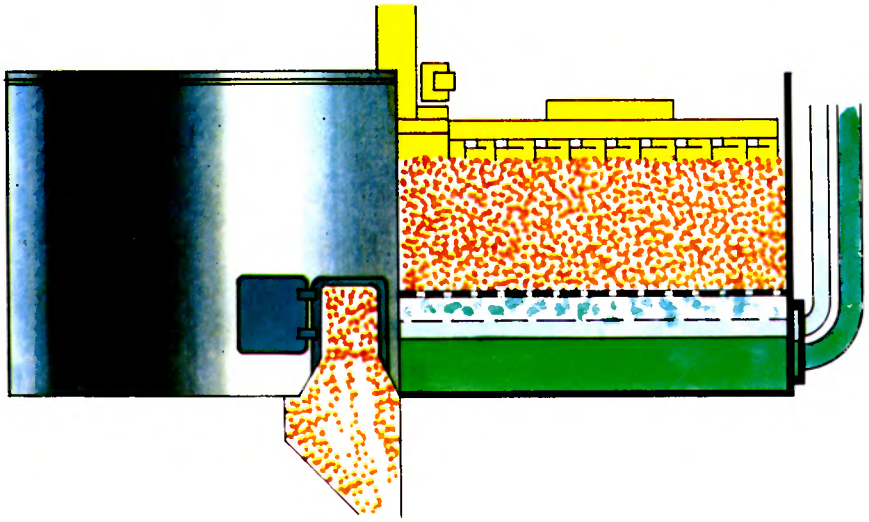
Conical ventilated steeps

This is a development of the conventional method of steeping, to give improved facilities for ventilation by the provision of a perforated inner cone and plenum, whilst retaining a simple gravity discharge for the grain. Vessels of this type are suitable for a maximum ventilation rate of 255 m^3 per hour per tonne, to ensure a controlled degree of pre-germination with batch sizes up to 50 tonnes of barley.



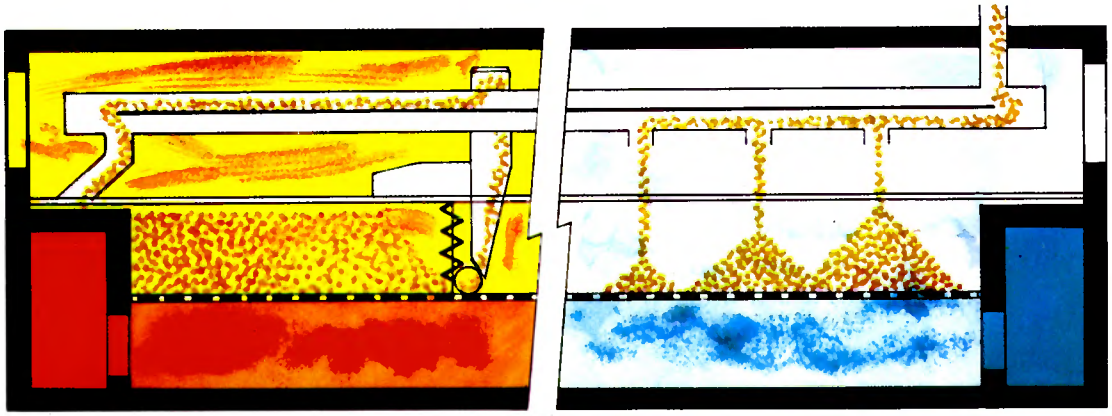
Flat bottom steeps

This vessel, with its perforated deck, gives an even bed depth and, being capable of ventilation rates up to 680 m^3 per hour per tonne, is ideally suitable for promoting rootlet growth cquivalent to the first day of germination. Loading, levelling and discharging are achieved with a single rotating machine. Batch sizes of up to 400 tonnes of barley can be accommodated.

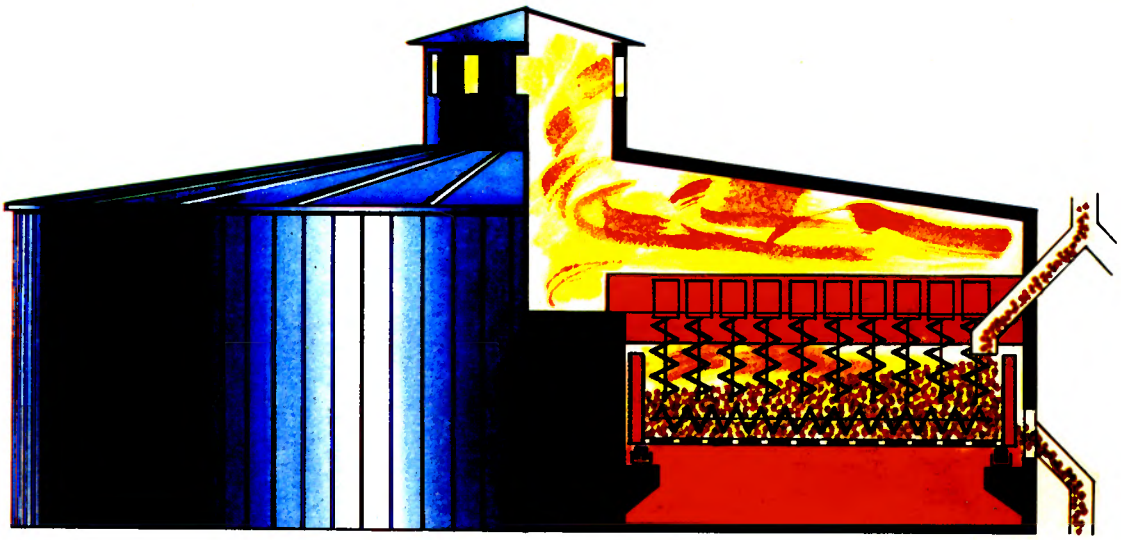


Combined germinating kilning boxes

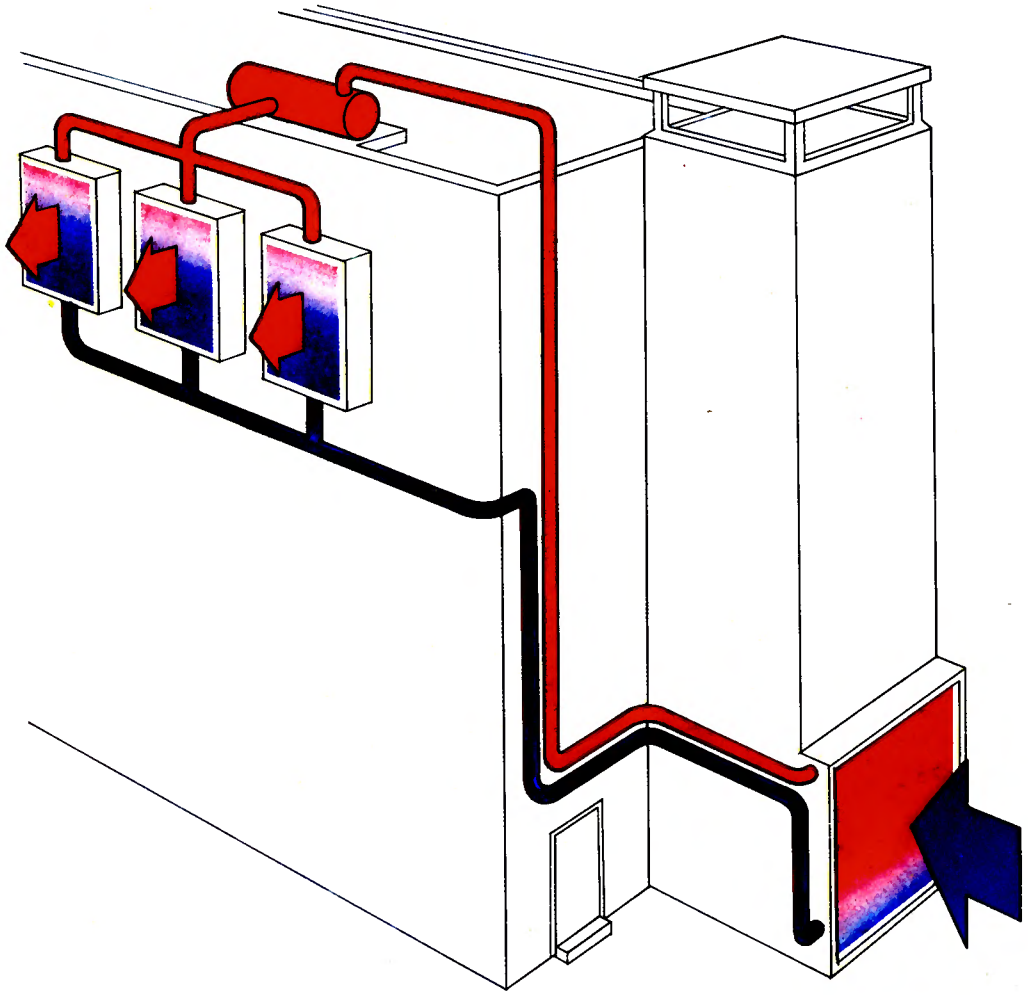
This well proven system of combining in a single box the two process phases of germination and kilning, provides maximum utilisation and flexibility. The time consuming task of washing and cleaning the perforated deck is eliminated and valuable process time is saved in avoiding the transfer from germination box to kiln. Loading and discharging are fully automated to reduce manpower to a minimum. The system is suitable for batch sizes up to 250 tonnes of barley.

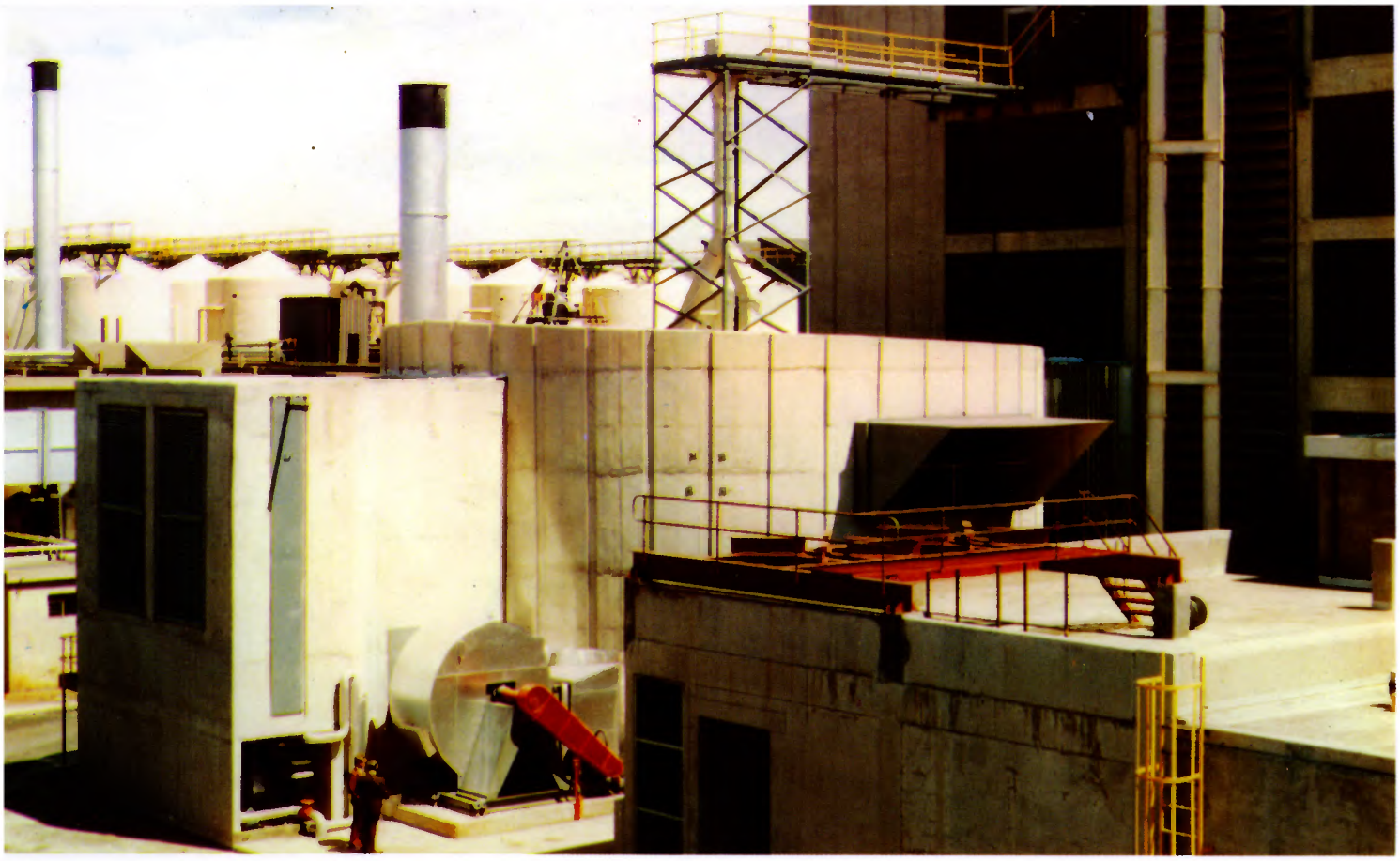


Circular maltings
This system embodies all the advantages of the combined box where larger batch sizes of 200 to 600 tonnes of barley are required. Circular in form, the building is of insulated steel construction and civil work is kept to a minimum to ensure low capital cost. The perforated floor rotates for the purposes of loading, turning and discharging, in conjunction with a stationary turner-stripper machine.



Malt kiln heat recovery
We have developed a way of using the enormous flow of heat from the exhaust stack of a malt kiln during the early stages of drying, when the air off the bed is saturated.
The REDLER patented system recovers this waste heat and puts it to use to reduce fuel consumption, saving up to 27% in fuel costs. A bank of heat exchangers at the kiln exhaust is connected in closed circuit with a further heat exchanger at the kiln fresh air intake, the whole system being charged with a refrigerant.
Warm, saturated air leaving the kiln passes through the exhaust heat exchanger, giving up heat to the refrigerant, which evaporates. The pressure produced forces the vapour to pass through the fresh air heat exchanger, giving up heat to the ingoing air. This causes the vapour to condense to a liquid, which is then pumped back to the exhaust in a continuous cycle.





Installation photographs by courtesy of the following:

Associated British Maltsters Ltd.
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Midland Malting Co. Ltd.
Minch Norton & Co. Ltd.
Munton & Fison Ltd.
Pauls & Sandars Ltd.

Top:
Modern malting plant.
Above:
Circular malt kiln.

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