

Cool Storage Notes

Overhaul of Refrigerating Plant

FRUIT cool storage chambers will now be empty, and few refrigerating plants, if any, will be operated until the new season's crop is ready for storage. Therefore, an opportunity presents itself to have a thorough inspection made of all the working parts of the plant in order that repairs and renewals may be effected, and all of the equipment of the store put into good running condition before the plant is again required for storage.

The parts of the ammonia compressor which require inspection are the main bearings, especially if these have given any trouble during the past season's run. The suction and delivery valves of the compressor also should be removed for inspection, as cracked or broken plates will need to be replaced, or pitting of the valve or seating may require attention. Worn spindles of stop and expansion valves require renewing, and the seating of faulty valves will also need attention.

Thorough Overhaul

The owner of a private cool store would be well advised to have a thorough overhaul of the electrical and refrigeration plant, including the condenser pump, carried out by his refrigerating engineer during the time the plant is not required.

When an ammonia compressor is not to be operated for some time it is always advisable to close the suction and delivery stop valves of the compressor and make sure that the compressor gland is perfectly tight. All stop and expansion valve glands should also be inspected, and the gland nuts tightened with a spanner. Flanges, also, should be tightened, as these precautions will avoid the leakage of ammonia.

Much of the work of scraping the cooling coils may be carried out by the hands employed on the orchard. These pipes should be thoroughly cleaned of all old paint and rust, and then painted with an anti-corrosive paint, such as aluminium paint. Drip trays and drainage pipes should be cleaned and painted.

All ammonia piping on the expansion side of the compressor which is outside of the cool chambers should be covered with insulation. Condenser coils also will require to be

scraped clean of all old paint and rust and repainted.

Cool Chamber Doors

Cool chamber doors are constantly in use during the year, and their padding often requires attention. They should be removed from the hinges for examination and the padding repaired if this is found to be necessary, as a cool chamber door with faulty padding is a potent source of leakage and loss of efficiency.

At the close of the season's run all waste fruit should be removed from the cool chambers and packing shed, and the floors swept clean and the chambers thoroughly disinfected.

To fumigate a cool storage chamber a sulphur and formalin candle is recommended. The door of the chamber should be kept tightly closed for 48 hours after lighting the candle.

Cost of Holding Fruit

The total costs of holding fruit in any particular store are made up of a number of fixed and variable charges, the more important of which are as follows:—

1. Capital charges on building and plant.
2. Depreciation.
3. Labour and supervision.
4. Fuel or electricity.
5. Oil, ammonia, calcium chloride, other stores, and repairs.
6. Insurance and rates.

The whole of these, together with miscellaneous and incidental costs, must be spread over the total number of cases of fruit handled, and it follows

therefore that as a proportion of the charges are fixed, the resultant cost of refrigeration per case is more a function of the degree of utilisation of the plant than it is of any other single factor.

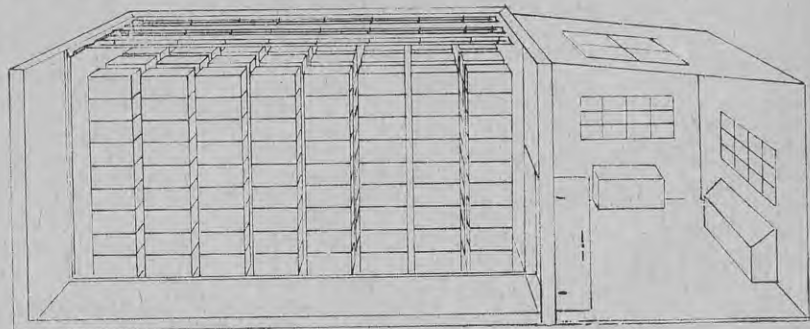
Not only is the utilisation of the available space an important factor, but the size of the store and of the plant, the relation of one to the other, and the thermal efficiency must be taken into account when dealing with costs of fruit cool storage space. When estimating these costs, each item of cost should be examined and considered in the light of its relative importance and its bearing on all the inter-related factors that make for efficient and economical storage.

Refrigeration Requirements

Refrigeration consists in the removal of heat. In a fruit store this process presents problems of biological engineering much more complex than is generally recognised by the fruit-grower. The total heat-removal requirements of a case of fruit over a season are very much in excess of the refrigeration effect necessary to chill the warm fruit down to, say, 35 degrees Fahrenheit.

The ammonia system is called upon to remove heat arising from many different sources, which may be classified as follows:—

- (a) The sensible heat of the chambers.
- (b) The heat leakage through the walls.
- (c) The sensible heat above, say, 35 degrees Fahrenheit of the warm fruit and cases.
- (d) The heat of respiration of the fruit.
- (e) The heat generated by lighting.
- (f) The body heat of workers in the chambers.



A sectional view of a cool storage chamber showing the method of stacking fruit cases to allow for a convexional air movement.