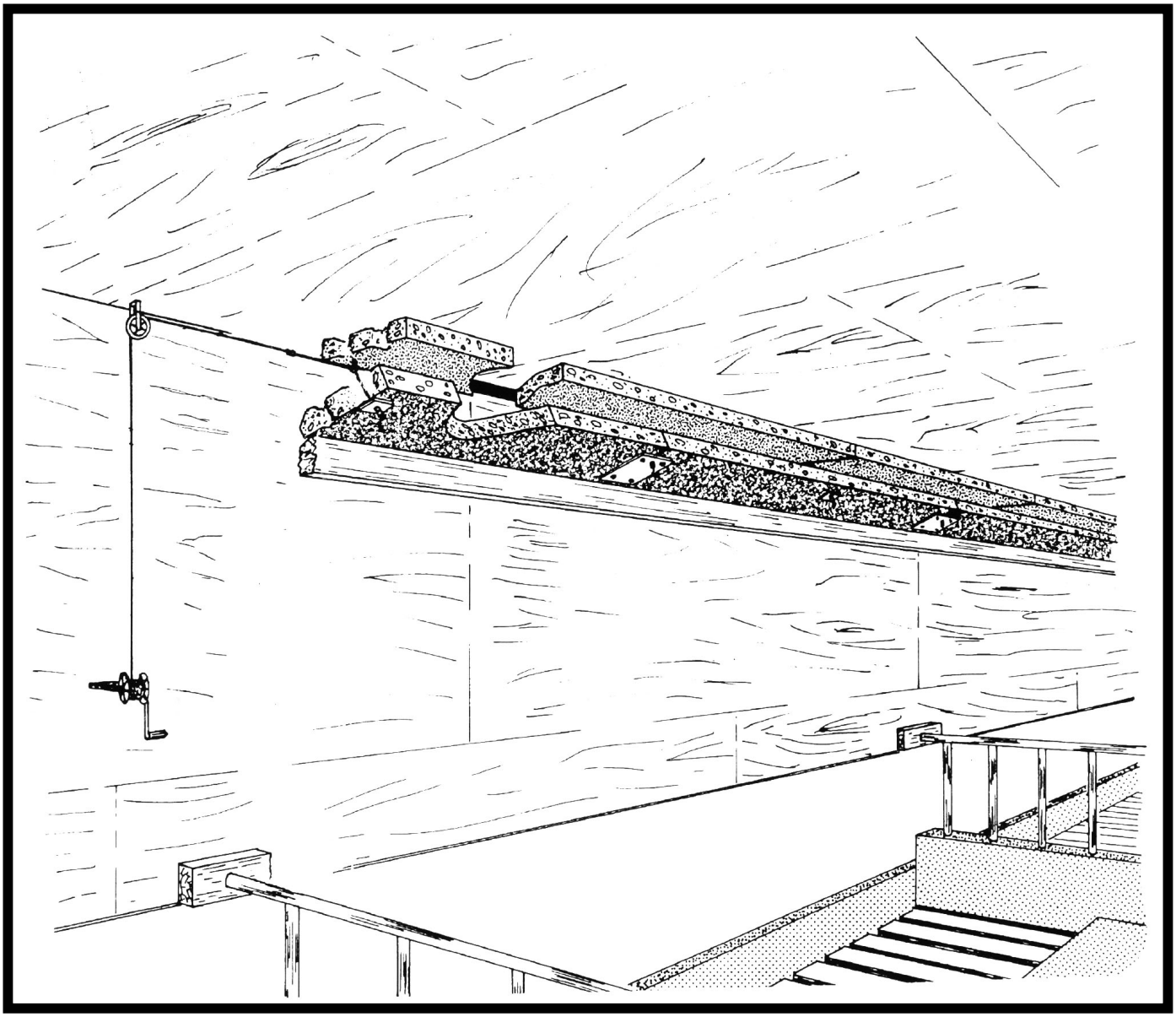
ADJUSTABLE SIDE AIR INLET



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ADJUSTABLE SIDE AIR INLET

CPS
PLAN Q-9714

This leaflet describes a plan for an adjustable sidewall air inlet for dairy, pig and poultry barns. For rooms 24 ft wide or less, a single inlet is adequate at the top of the long wall opposite the fans. For wider rooms, two inlets are recommended, one at each long wall.

This inlet provides a manually adjustable ceiling-level opening that directs incoming fresh air along the ceiling for cold weather tempering of the air. It also has another manual adjustment to direct inlet air down into the alleys for hot weather cooling of livestock.

CONSTRUCTION

The inlet is constructed from readily available materials. They include 1 and 2 in. thick sheets of rigid extruded polystyrene insulation (blue coloured). The extruded polystyrene is used because it is light, strong and also provides insulation, reducing condensation on the inlet in winter. To eliminate waste, dimensions have been selected so the sheets can be cut in half lengthwise. Use a table saw to cut the polystyrene so the necessary smooth square edge is obtained. Other materials needed are 2 x 4 in. lumber, flat iron, plywood, nylon string, plastic-coated clothesline cable, screw eyes, Nos. 1 and 2 electrical Marr connectors, two small pulleys, one small hand winch, bolts and coated nails. Use considerable care when constructing this inlet since it must be very straight and installed precisely in order to function. Future maintenance will be minimal.

OPERATION OF THE INLET

The amount of air coming through the inlet is controlled by the capacity of exhaust fans, but the velocity of the inlet air is affected by both the fan capacity and the size and shape of the air inlet. The inlet should be adjusted to provide an air velocity of 800 to 1000 ft/min. This can be accomplished by supplying about 1 ft^2 of inlet opening per 1000 ft^3 of air per minute (cfm) of fan capacity. Fans exhaust stale barn air and create a negative pressure inside the barn. This negative pressure causes air to enter the barn through the inlet. If the inlet is adjusted properly, the incoming air will enter the barn in an acceptable pattern, providing good ventilation.

Adjustments are made by operating a small winch that raises and lowers the inlet baffle, effectively closing and opening the air inlet.

WINTER OPERATION

During cold winter temperatures (-40^{o}C to –10^{o}C) the opening need only be about 1/8 in. It must never by completely closed. Frosting and condensation of the inlet will be minimal. The narrow inlet opening allows the incoming cold air to travel along the ceiling at a high velocity. It mixes with and is warmed by the existing barn air before contacting the livestock, thus the animals are never subjected to a cold draught.

SPRING AND FALL OPERATION

This inlet can be manually adjusted to cope with the normal variability of the weather that occurs in spring and fall. At an outside temperature of 0^{o}C, the opening should be about 1/2 in.; at 15^{o}C about 1 in. These are approximate settings and experience will soon indicate the correct opening for different temperature conditions. The winch should be conveniently located so the operator can adjust the baffle as often as needed, which might be twice daily to compensate for large temperature variations.

SUMMER OPERATION

At an outside temperature of 30^{o}C, the baffle should be fully opened. Depending on the type of livestock and their arrangement within the barn, the baffle may be opened horizontally or vertically. The horizontal position directs air along the ceiling while the vertical position directs air down to the livestock. Directing air vertically down on a slotted floor pigpen in which slots are directly beneath the inlet will encourage the pigs to have bad manuring habits. Pigs will rest on the slots in the cooling draught and manure in their resting or eating areas.