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Poultry Housing Tips

Inlet Machine Installation

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A side wall inlet machine can take a lot of the work out of controlling house temperature and air quality while at the same time minimizing fuel usage. An inlet machine insures that the inlets open when the timer fans come on and close when they shut off. As outside temperature increases and more fans come on to cool the house, an inlet machine increases the amount of inlet opening to match the number of fans operating. As a result, the outside temperature can vary from below freezing to 60°F or more without the grower having to make adjustments to fans or inlets.

One of the biggest complaints growers have about inlet machines is breaking cables. When ventilation is provided mainly by timer fans during cold weather, an inlet machine may open and close side wall inlets nearly 300 times a day. This constant opening and closing of inlets puts a lot of stress on cables as they move back and forth over turning pulleys and throw backs. If an inlet machine and cables are not installed properly, cable breakage can be a major problem.

There are a number of things producers and equipment installers can do to minimize cable breakage. These include:

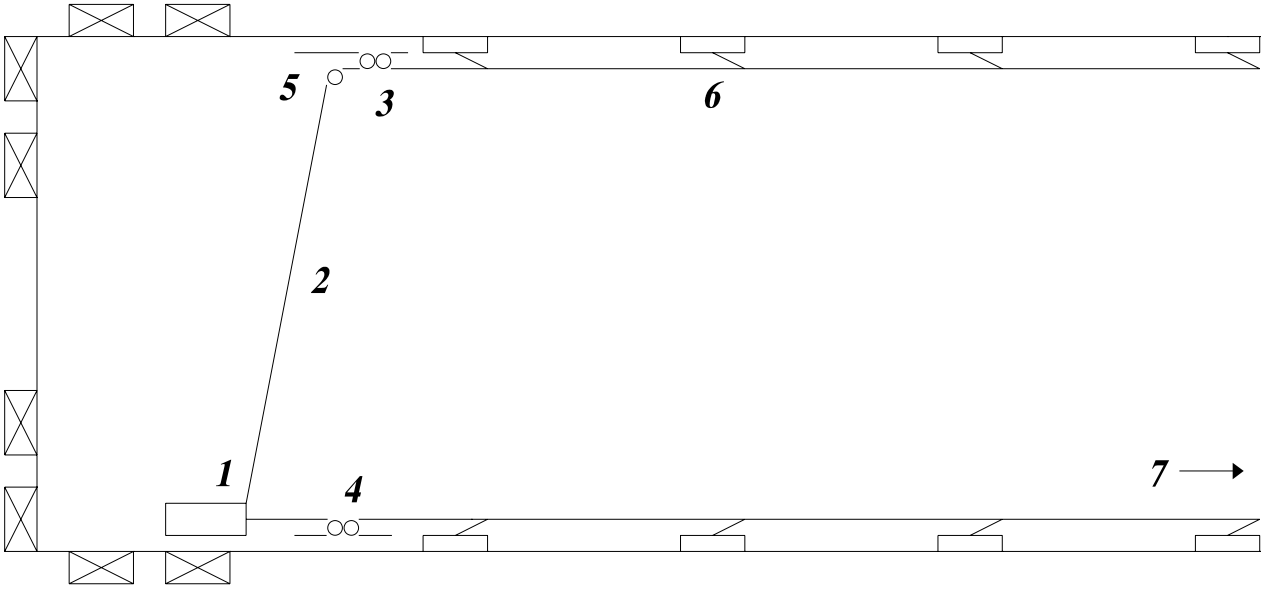
1) *Reduce the number of pulleys:*
   Every time a cable moves around a pulley it stresses the cable. The more pulleys you have the more sections of weakened cable there are.
2) *Increase the size of pulleys:*
   The smaller the pulley, the greater the stress placed on the cable. Small pulleys (i.e. 2" in diameter) may cause broken cables in less than one year. Ideally, pulleys should be 4" in diameter to maximize cable life (see *Cable Life and Pulley Size, April 1995*).
3) *Minimize cable sag and stretch:*
   The more a cable sags and stretches, the more tension required to insure the all the inlets close at the same time.
4) *Minimize cable tension:*
   The more cable tension, the more stress placed on the cables when they move over turning pulleys and throw backs.
5) *Make sure that cables are properly aligned with pulleys.*
   If a cable is not fed straight into the groove on a pulley, it will rub against the lip of the grove causing wear.

There is a new method of installing inlet machines that incorporates all of the above ideas with a couple of new ones. It has been tested on a number of different farms and after nearly a year of operation, cable breakage and wear problems have been noticeably reduced.
The main difference in this new way of installing inlet machines is that the inlet machine pulls the inlets open, not closed. A large spring connected to the inlet cable on the opposite end of the house from the inlet machine is used to pull the inlets closed. By using a spring to pull the inlets closed, the tremendous strain (several hundreds of

pounds) that an inlet machine can place on cables when closing the last couple of inches is eliminated. The maximum force the spring can place on the cable is approximately 100 pounds, thus insuring that the cable is never over tensioned.

The force required to close the inlets is further reduced because high tensile fence wire is used instead of cable. The high tensile fence wire does not stretch and sag as much as cable so it is easier to make the inlets close uniformly. When the inlets close uniformly, it takes less force to close the inlets. In addition, the high tensile fence wire is run the length of the house. This minimizes the number of turning pulleys required as compared to installing the inlet machine in the center of the house and running cable to both ends of the house.

The diagram below illustrates the basic layout of the inlet machine, pulleys, wire, and springs. The photographs on the following pages show each of the numbered areas in more detail.



The inlet machine is mounted in the ceiling approximately one foot from the side wall near tunnel fan end wall. By mounting the inlet machine in the ceiling the number of turning pulleys is reduced. One cable exits the top of the machine, the second cable exits the side. The cable which comes out of the side of the machine is directed across the ceiling at a 45 degree angle toward the inlets on the opposite side of the house. Running the cable across the house at a 45 degree angle minimizes cable stress as it moves over the pulleys. The inlet machine has to be rewired so that it lets out cable, instead of pulling the cable when it gets a low pressure signal from the static pressure controller.

Figure 1. Ceiling mounted inlet machine

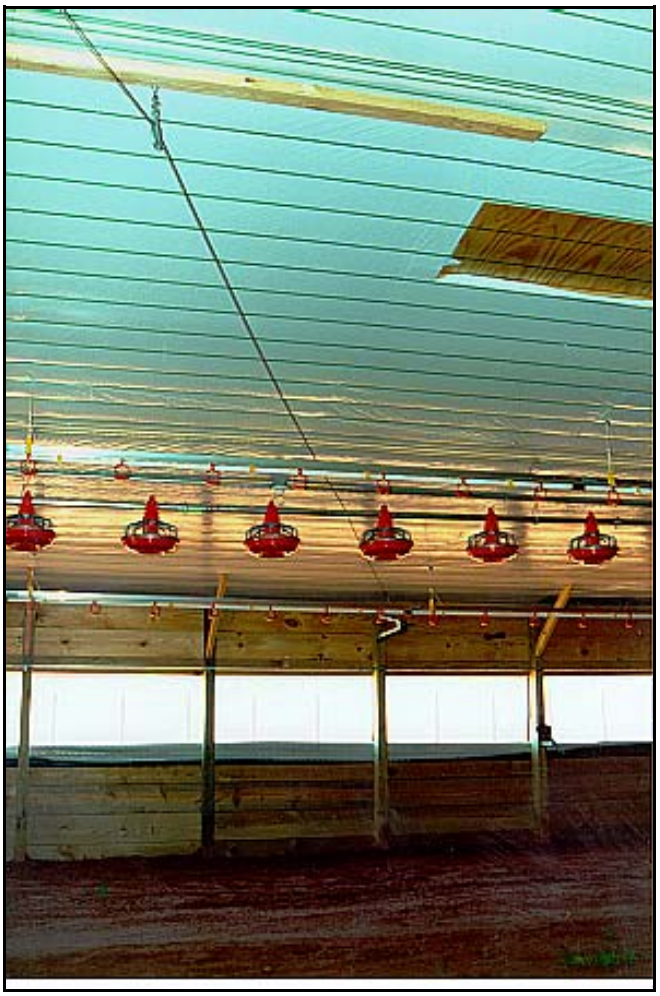


Figure 2. Inlet cable directed across house to inlets on opposite side of house.

The cable directed across the ceiling to the inlets on the side of the house opposite the inlet machine is supported at the peak of the ceiling by a pulley. At the far side wall the cable is redirected by a second pulley down along the side wall in front of the side wall inlets.

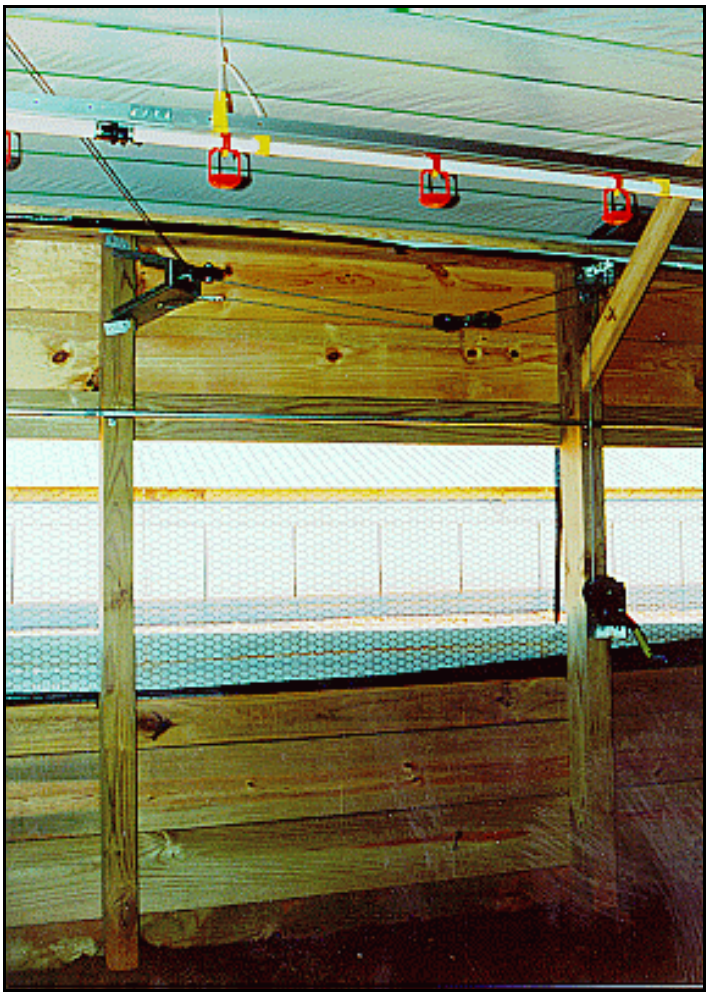


Figure 3. Cable pulleys with hand winch.

When the cable reaches the side of the house opposite the inlet machine, it goes around a pulley and is attached to a post. The pulley is joined to a second pulley. A second cable emanating from a hand winch goes around the second pulley and is then directed toward the inlets on this side of the house. The double pulley arrangement allows the installation of a hand winch without changing cable speed. Notice that there is very little cable tension at the inlet machine when the inlets are closed as evidenced by the fact that the cable going around the double pulley arrangement is sagging slightly.

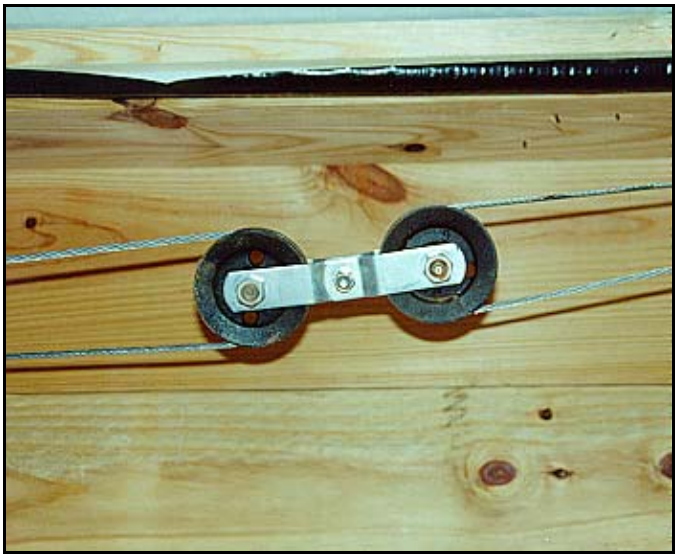


Figure 4. Large pulleys

The pulleys should have a minimum diameter of 4" to minimize cable stress. The smaller the pulley the more likely the cable will break. The pulleys in this picture have grease fitting to minimize turning friction.

Figure 5. Hand winch and pulleys

The inlet machine is located to the right of the above picture. A pulley behind the knee brace directs the cable a couple inches in front of the inlets. Just past the second knee brace, the cable is attached to heavy duty high tensile fence wire (12 gauge). The high tensile fence wire does not sag and stretch as much as cable. Furthermore, the fence wire is that it does not twist like cable eliminating the problem of inlet strings rapping around the cable.

Figure 6a. Ceiling inlet and high tensile wire.

The inlet machine is to the left of this photograph. A string attached to the inlet door goes through a small pulley directly above the handle and is then tied to a spring and a chain. The chain is then connected to the high tensile wire on the right side of the picture. The spring protects the inlet door handle if by chance the wire is over tensioned. A chain and "S hook" allows small adjustments to be made to an inlet without retying the string. The installation would be more or less the same if the inlet was in the side wall instead of the ceiling.

Figure 6b. Small side wall inlet spring and chain.

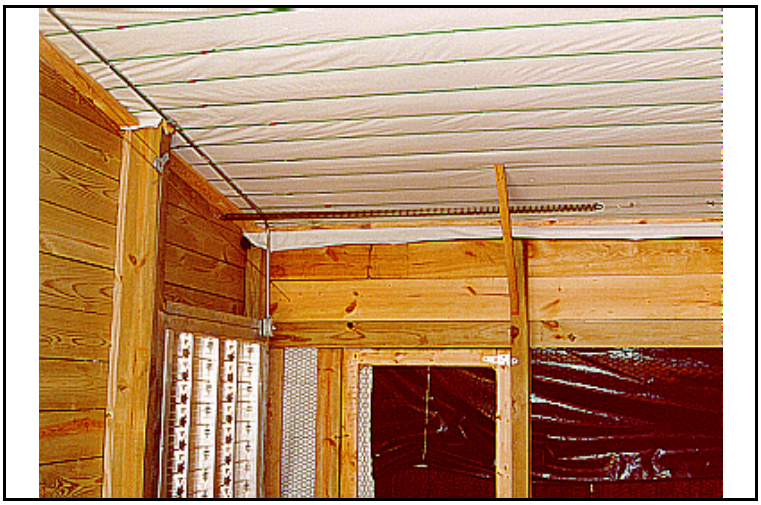


Figure 7. Spring used to pull inlets closed

The high tensile fence wire is connected to a large spring (100 lb) which is then attacted to the end wall at the opposite end of the house. In this particular house the inlet machine is installed near the tunnel ventilation fans and the spring is connected to the end wall in the brooding area.

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