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EC729 Outdoor Electric Chick Brooder for Small Flocks

F. D. Yung

R. M. Loper

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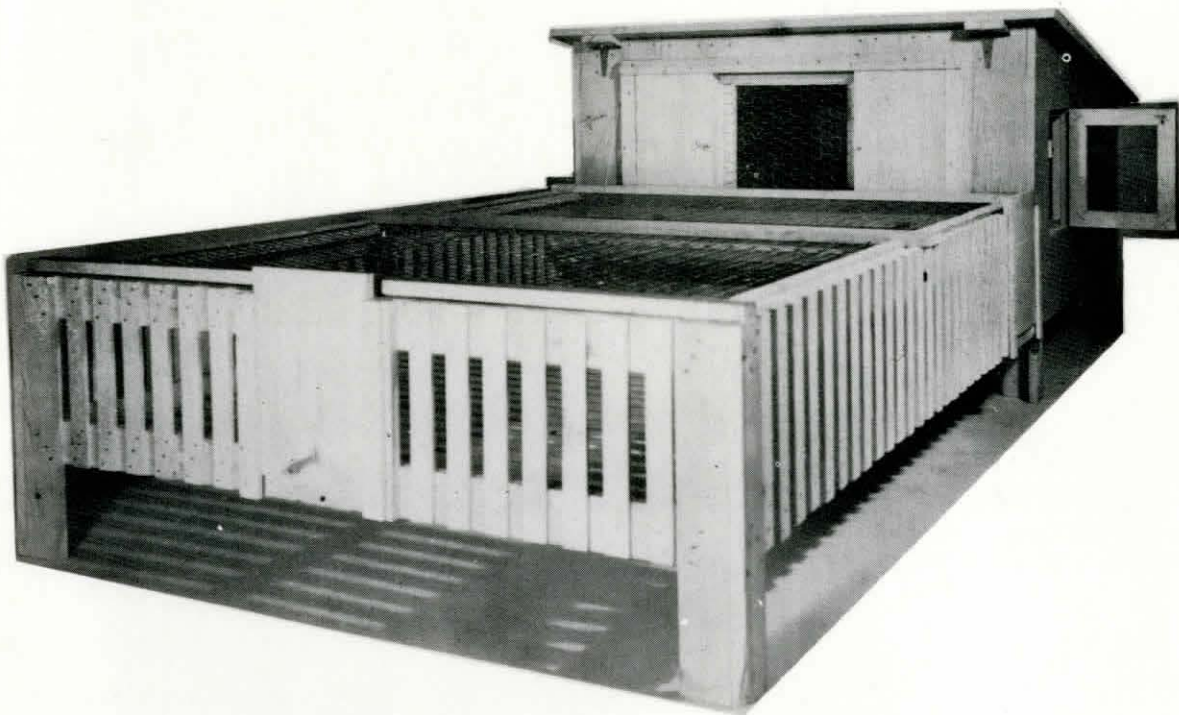
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Nebraska
COOPERATIVE EXTENSION WORK
IN AGRICULTURE AND HOME ECONOMICS
U. of N. Agr. College & U. S. Dept. of Agr. Cooperating
W. H. Brokaw, Director, Lincoln

Extension
Circular
729

OUTDOOR
ELECTRIC CHICK BROODER
FOR
SMALL FLOCKS



Prepared by
F. D. Yung, Research Agricultural Engineer
R. M. Loper, Assistant Extension Agricultural Engineer

OUTDOOR ELECTRIC BROODER

Many town people are planning to raise some chickens this year to provide more meat and eggs for their families. Fuel houses, garages, unused sheds and barns may be utilized as laying houses later in the season, but these buildings often are unsuitable for brooding purposes. Consequently, brooders of some sort must be provided if death losses of small chicks are to be held to a minimum. Commercial brooding equipment is difficult to obtain, but homemade brooders can be built easily, and at a reasonable cost. Only small amounts of critical materials are needed, and frequently such material is already on hand.

Electricity may be used as a source of heat, thereby reducing fire hazards and eliminating the necessity of finding kerosene-burning equipment and the difficulties of obtaining kerosene at the present time.

The brooder described in this circular was constructed by the Department of Agricultural Engineering of the Nebraska College of Agriculture, in cooperation with the Poultry Husbandry Department, and is designed for late season brooding. Trials at the Poultry Plant, beginning early in March, 1943, have indicated that early season outdoor operation is feasible if the brooder is well insulated and is carefully operated in a sheltered location. Near zero weather had no observed ill effects on the chicks, but various combinations of 50-watt and 100-watt lamps were required to meet the changing weather conditions.

Construction of the Brooder

Size — The ground dimensions of the brooder are 4'-0" x 4'-0". The floor is 12 inches off the ground and the rear wall height is 2'-2" while the front wall height is 2'-10". A 4'-0" x 6'-0" lath sun pen may be placed in front of the house to provide additional space.

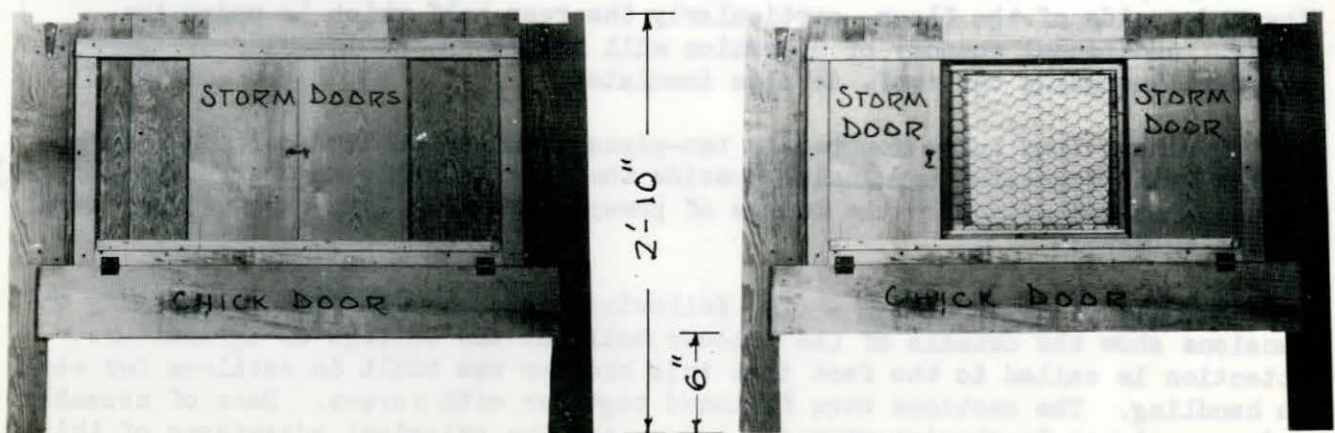
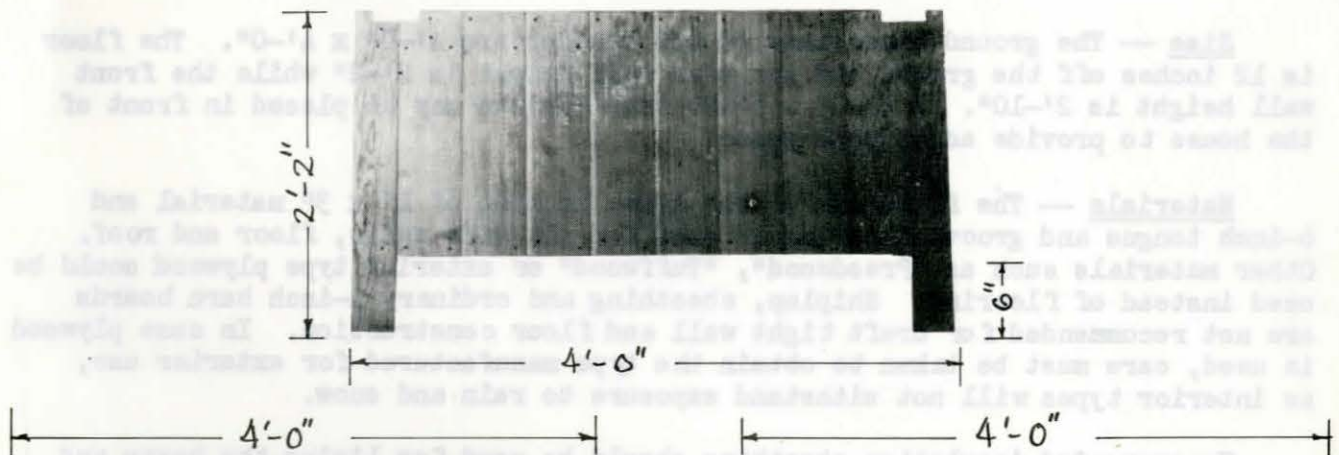
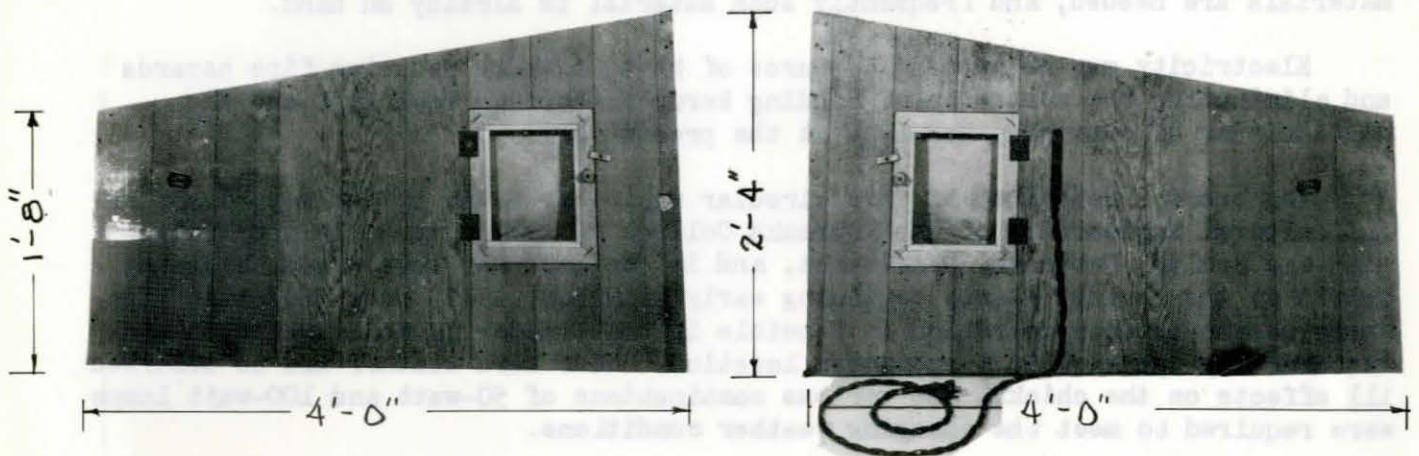
Materials — The framework of the house is made of 1" x 3" material and 6-inch tongue and groove flooring is used for the side walls, floor and roof. Other materials such as "Presdwood", "Tuffwood" or exterior type plywood could be used instead of flooring. Shiplap, sheathing and ordinary 1-inch barn boards are not recommended for draft tight wall and floor construction. In case plywood is used, care must be taken to obtain the type manufactured for exterior use, as interior types will not withstand exposure to rain and snow.

Vaporproofed insulation sheathing should be used for lining the hover and the under side of the floor, particularly the rear half which is under the hover. Additional economy of operation will result if the interior of the whole brooder, including the roof, is also insulated.

Ordinary lamp bulbs mounted in two-piece combination base porcelain receptacles (with concealed terminals) provide the heating unit. Brewery cord (No. 14) is used for connection to the source of power. Ordinary lamp cord (indoor type) is not suitable.

Details of Construction — The following pictures with the accompanying dimensions show the details of the brooder built at the College of Agriculture. Attention is called to the fact that this brooder was built in sections for ease in handling. The sections were fastened together with screws. Ease of assembly and convenience in storing when not in use are the principal advantages of this "knock-down" construction.

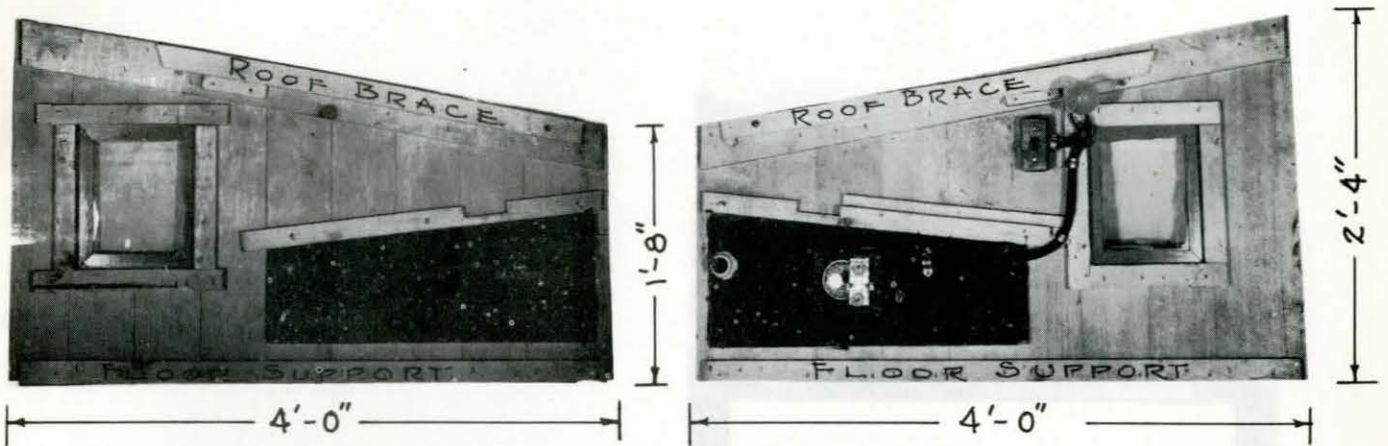
THE PICTURES BELOW SHOW THE EXTERIOR
OF THE SIDE, BACK AND FRONT WALLS



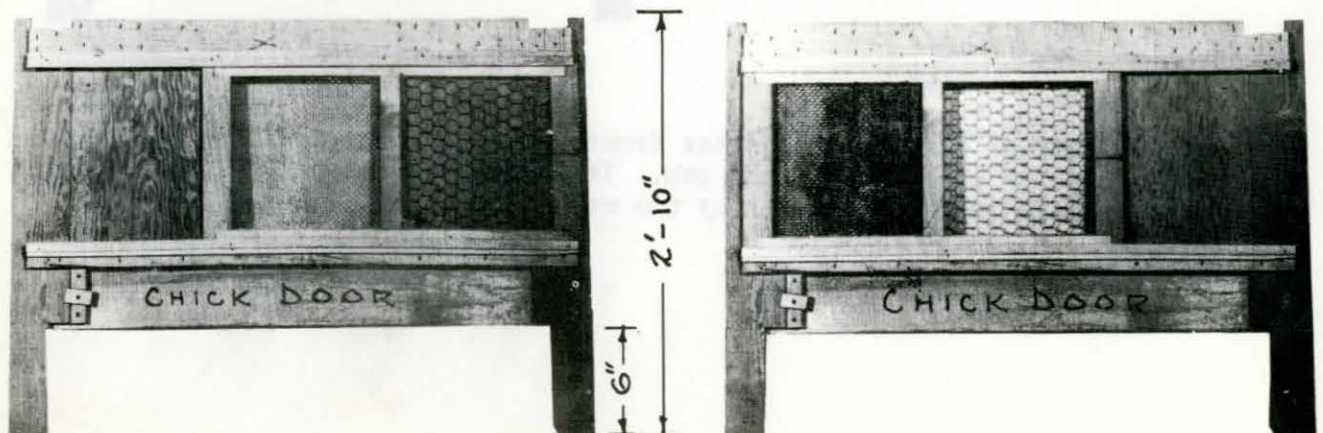
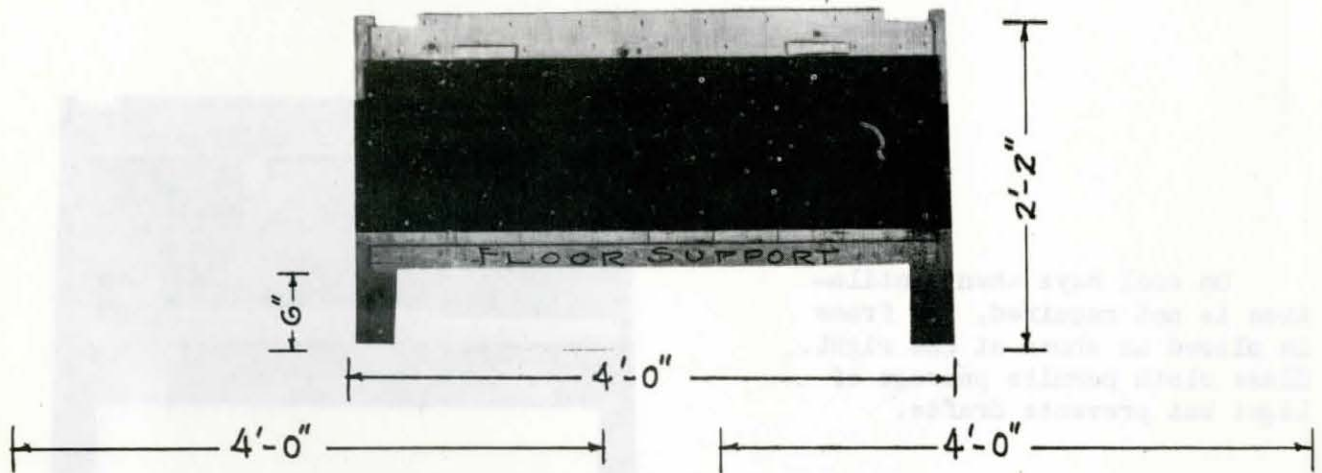
FRONT WALL
STORM DOORS CLOSED

FRONT WALL
STORM DOORS OPEN

THE PICTURES BELOW SHOW THE INTERIOR
OF SIDE, BACK AND FRONT WALLS



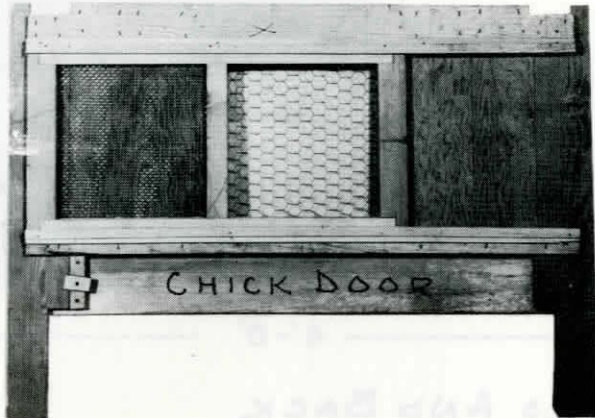
NOTE INSULATION ON SIDES AND BACK



FRONT WALL
SLIDING FRAME IN POSITION
TO TRANSMIT LIGHT ONLY
SLIDING FRAME IN POSITION
TO TRANSMIT LIGHT AND AIR

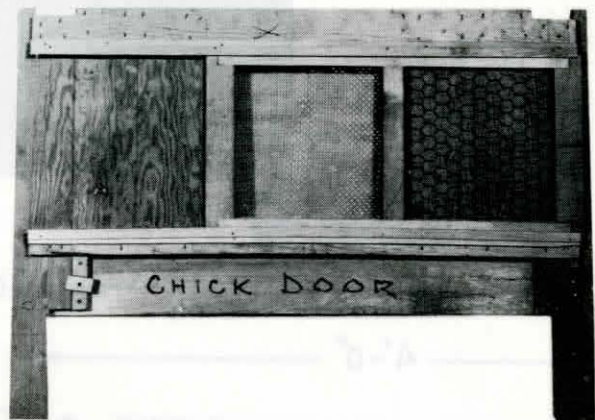
Ventilation, light and protection from sparrows, cats and dogs are provided by a sliding frame on the inside of the front wall. One-half of this frame is covered with 1-inch mesh poultry netting and the other half with glass cloth. Tracks for the frame are made by nailing cleats to the inside of the front wall as shown.

Inside views of the front wall are shown below:



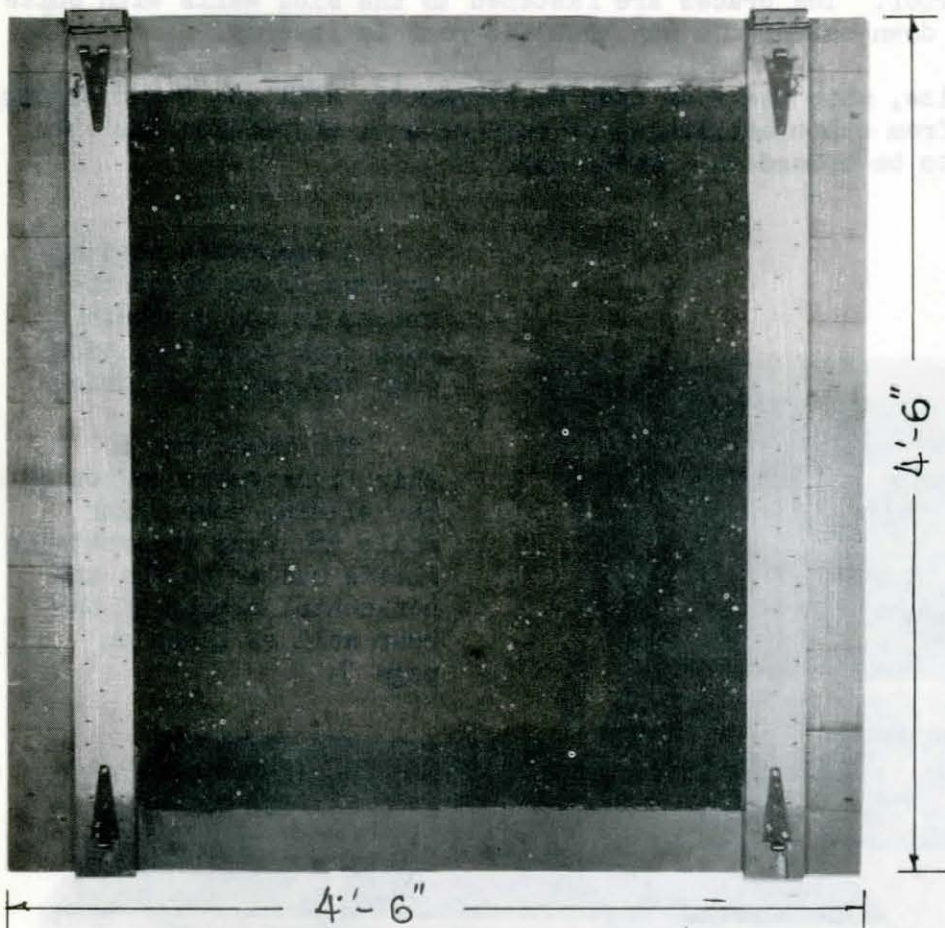
Passage of light and air is permitted, when the frame is placed as shown at left, but sparrows, cats and dogs are kept out and the chicks are kept in.

On cool days when ventilation is not required, the frame is placed as shown at the right. Glass cloth permits passage of light but prevents drafts.



A chick door at floor level in the front wall provides a passage way for the chicks from the house to the sun pen. It is hinged at the top to swing out, but when closed is held in position by the wood turn-buttons as shown above.

The roof is made of 6-inch tongue and groove flooring nailed to 1" x 4"s spaced as shown below. Vaporproofed insulation sheathing on the under side of the roof will contribute to the comfort of the chicks and economy of brooder operation. The under side of the roof is shown below.



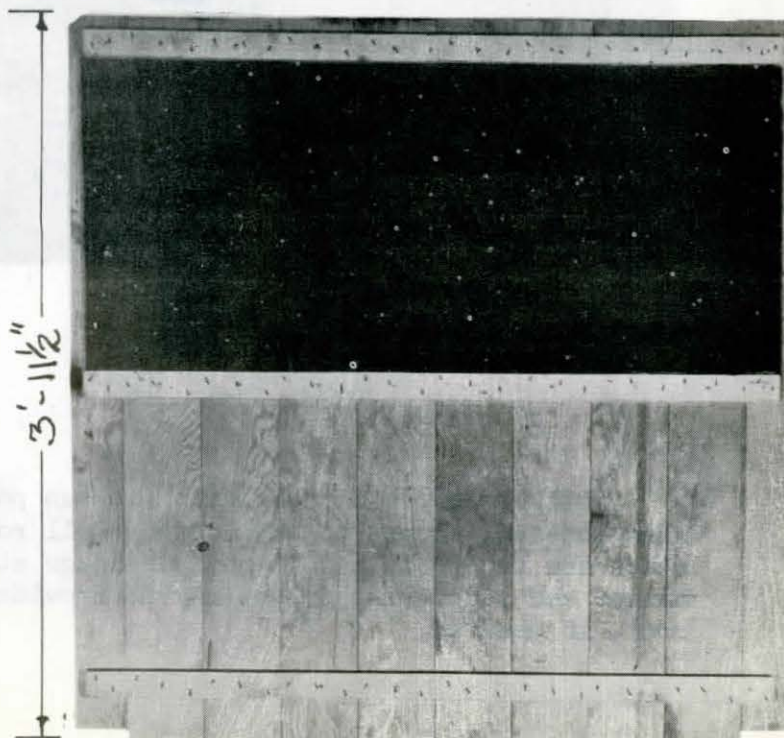
Four-inch strap hinges, fastened to both ends of the 1" x 4"s, provide for either front or back opening of the roof. The pins are driven out of the hinges (after grinding or filing off one end of the pin) and nails of suitable size substituted as convenient removable pins.

Blocks are needed at the ends of the 1" x 4"s for stability of the braces which support the roof when it is open. Blocks are required at both front and rear of the roof if it is to open from both directions.

Floor dimensions and the use of insulation on the under side of the floor are shown at the right.

Tongue and groove flooring is nailed to 1" x 2"s with 6d cement coated box nails which are long enough to permit clinching on the under side. The 1" x 2"s and the insulation are approximately 1 1/2 inches shorter than the width of the floor to provide space for the floor supports on the walls.

Attention is called to the notches on the front corners of the floor. These are needed to allow the floor to extend through the chick door opening so as to close the space between the front of the brooder and the sun pen.

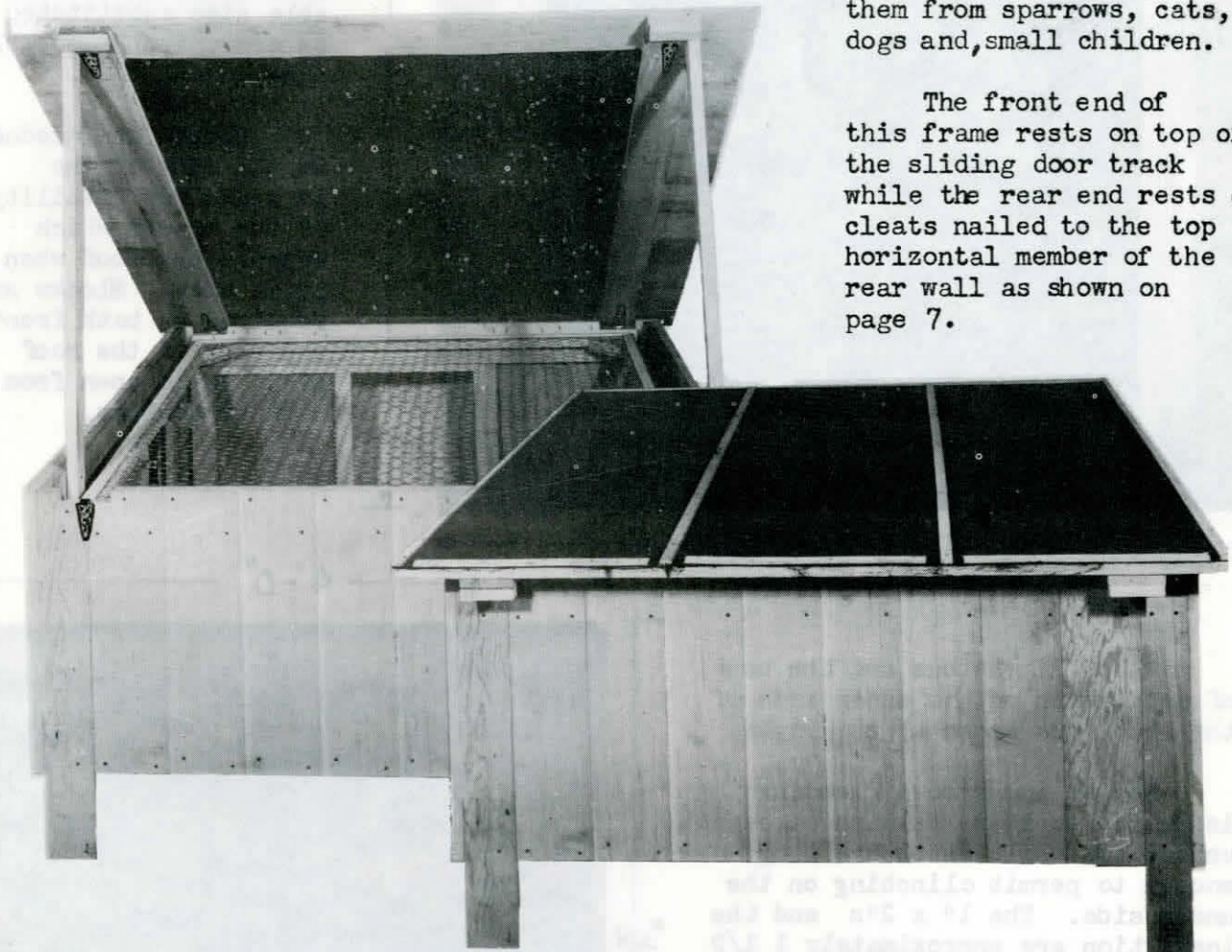


The floor of the house may be flooded with sunlight, on warm quiet days when the chicks are small, by turning the rear of the house to the south and raising the roof as shown below. The roof is hooked to the supporting braces to prevent wind damage. Stability for the braces is provided by the small blocks nailed to the under side of the roof. The braces are fastened to the side walls with bolts so they may be dropped down out of the way when the roof is lowered.

A house of this size, with the roof open as suggested, will not stand strong, gusty winds. Shelter from other buildings, or some natural protection will be needed if the roof is to be opened on a windy day.

A removable netting-covered frame keeps the chicks in and protects them from sparrows, cats, dogs and small children.

The front end of this frame rests on top of the sliding door track while the rear end rests on cleats nailed to the top horizontal member of the rear wall as shown on page 7.



When the house is used with the sun pen it faces south and the roof, when lowered, slopes to the north. Roll roofing is held in place with cleats which are spaced to permit roof drainage at the lower edge. A second set of hinges and supporting braces may be provided to permit front opening of the roof, if desired.

Construction of the hover top is shown below. Attention is called to the fact that the length of the 1" x 2"s, to which the flooring is nailed, and the width of the insulating material are slightly less than the overall width of the top. This difference is necessary to obtain a snug fit between the hover top and the rear wall, since the top rests at an angle when in place.

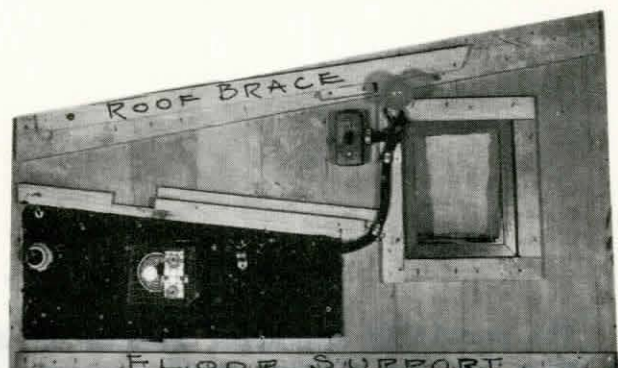
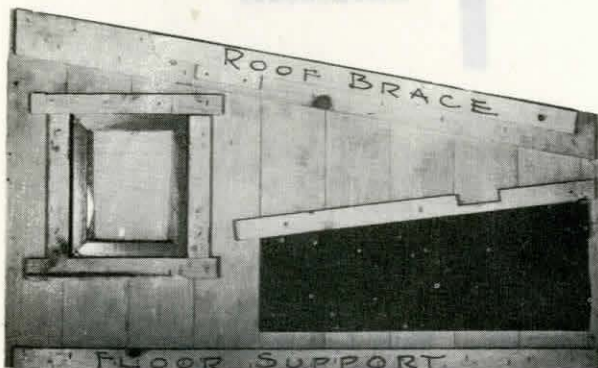


Two thicknesses of canvas curtain are fastened to the front edge of the top. The cuts in the curtain are staggered to conserve heat and prevent drafts.

Details of the rear wall are shown at the right. The cleats or blocks, nailed to the top 1" x 4", support one end of the screen-covered frame shown on page 6.



The notches in this 1" x 4" assure a snug fit between the roof and the rear wall. Space is left between the bottom 1" x 2" floor support cleat and the insulation to permit a tight joint between the floor and the rear wall. Notches are needed in the upper corners of the insulation to receive the sloping 1" x 4"s which reinforce the upper edges of the side walls.

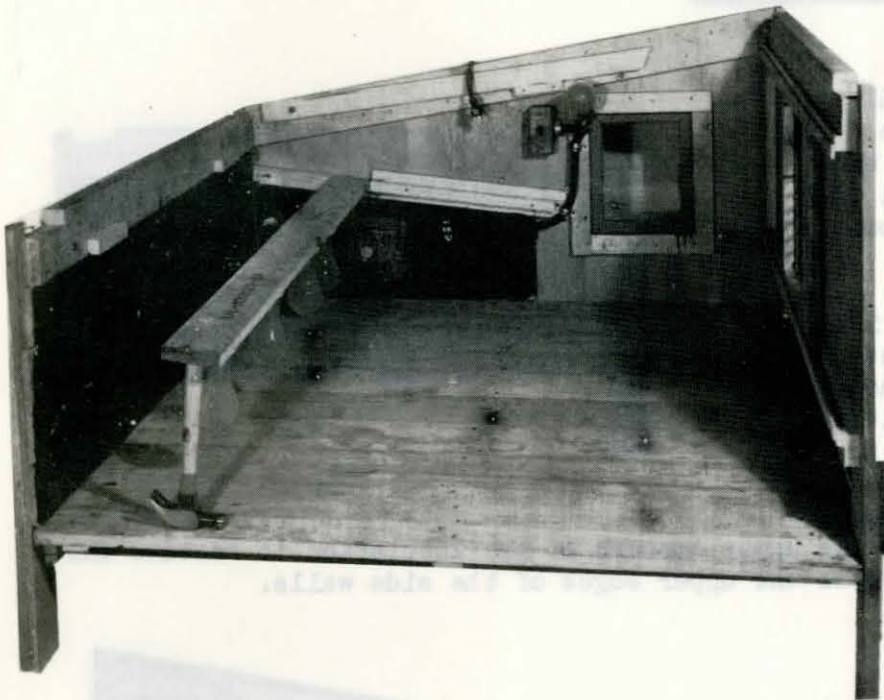


Interior details of the side walls are shown above. Here again a tight joint between floor and wall is obtained by leaving approximately a 3/4-inch space between the 1" x 2" floor support and the insulation.

The braces which support the roof when it is open are shown resting on their stop blocks near the top edge of the side walls.

The connecting cord enters the switch box through the side wall. The switch controls the lamp which illuminates the feeding space in front of the hover, but does not control the lamps under the hover. The use of the feeding light is discussed on page 13. The circuit for the heating lamps passes through the switch box and is controlled by the thermostat. A wire guard of hardware cloth protects the thermostat and prevents the piling of the chicks around it.

The porcelain receptacle near the thermostat forms part of the connection which is broken when the brooder is knocked down. When the brooder is assembled the heating unit (lamps) is plugged into this receptacle. Part of the wiring is enclosed in non-metallic flexible tubing (loom) for mechanical protection.



The 1" x 3" wood strip, on which the porcelain receptacles for the heating lamps are mounted, rests in notches cut in the upper edges of the end supports for the hover top. This arrangement permits easy removal of the heating unit, and also permits the hover top to slide forward for inspection of the chicks in the hover. The heating unit is shown plugged into the porcelain receptacle near the thermostat.

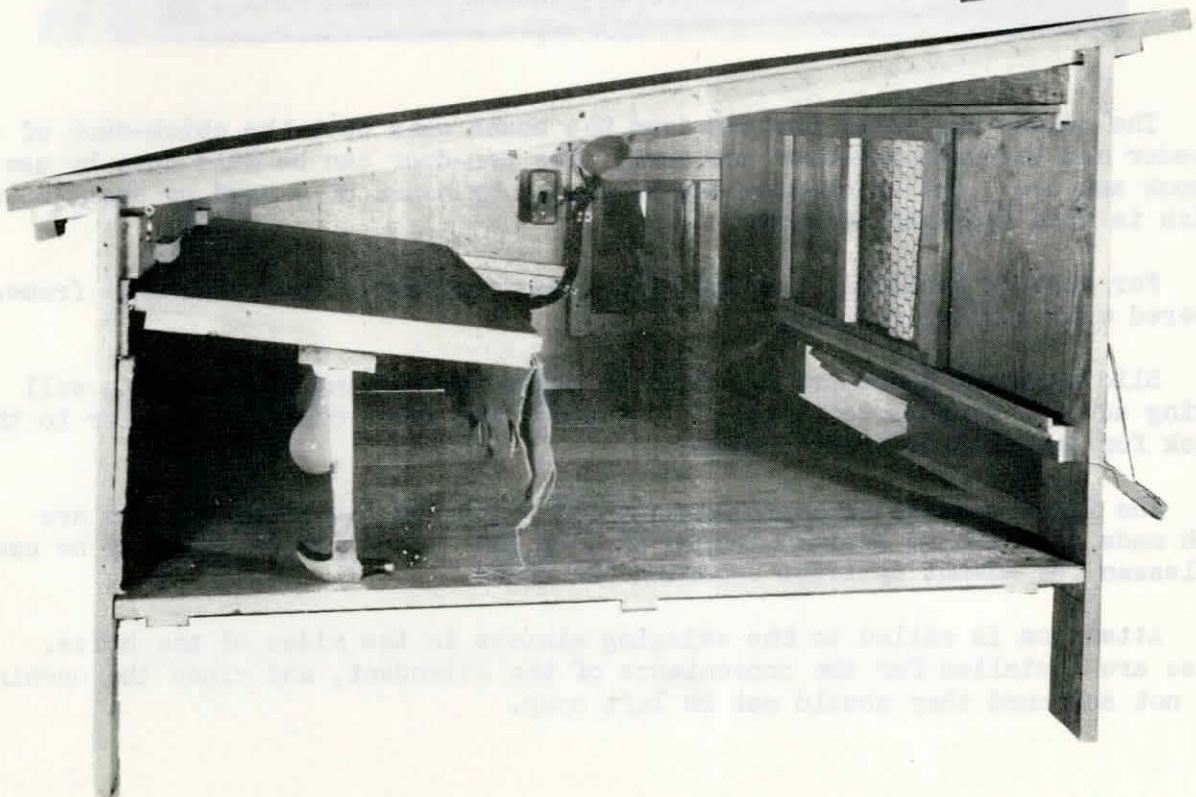
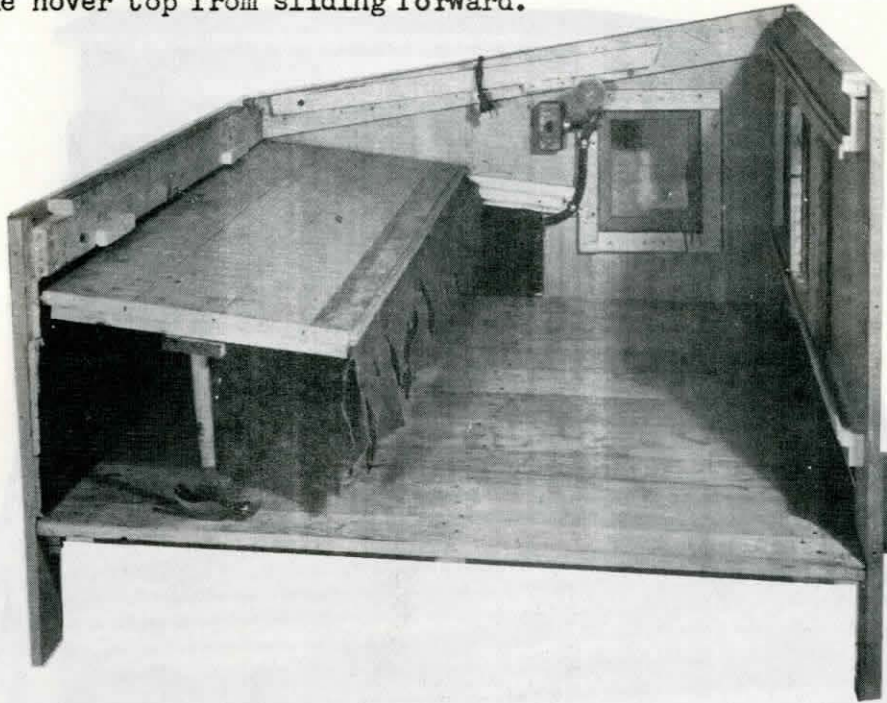
The partially assembled brooder is shown above. Note the construction of the track for the sliding double-purpose window in the front wall. The floor is snugly fit between the insulation on the rear wall and the 1" x 2" floor support.

The vaporproofed insulation on the under side of the floor helps to retain heat within the hover, but leaves the floor surface free for cleaning.

Two or three coats of good floor paint or creosote will retard moisture penetration and future warping of the floor boards. Chicks should not be placed in the brooder until several days later to avoid trouble which might arise from their breathing the paint or creosote fumes.

Additional steps in brooder assembly are shown below.

In the first picture three of the walls and the floor have been fastened together. Although the hover top and the 1" x 3" holding the lamps also are shown in place to illustrate the method of installation, they ordinarily would not be installed until after the other side is fastened in place. A hook and eye prevent the hover top from sliding forward.



The roof is shown in place above and the chick door in the front wall is open.

A 4'-0" x 6'-0" lath sun pen in front of the house increases the capacity and contributes to good sanitation, as the lath floor is more or less self-cleaning.



The chicks may enter the pen from the house when both the chick-door of the brooder and the lath pen-door are open. The pen-door can be held open by use of a hook and eye. The chick-door can be opened by means of a cord or small rope which is then fastened as shown.

For ease of handling, the top of the pen consists of two removable frames covered with poultry netting.

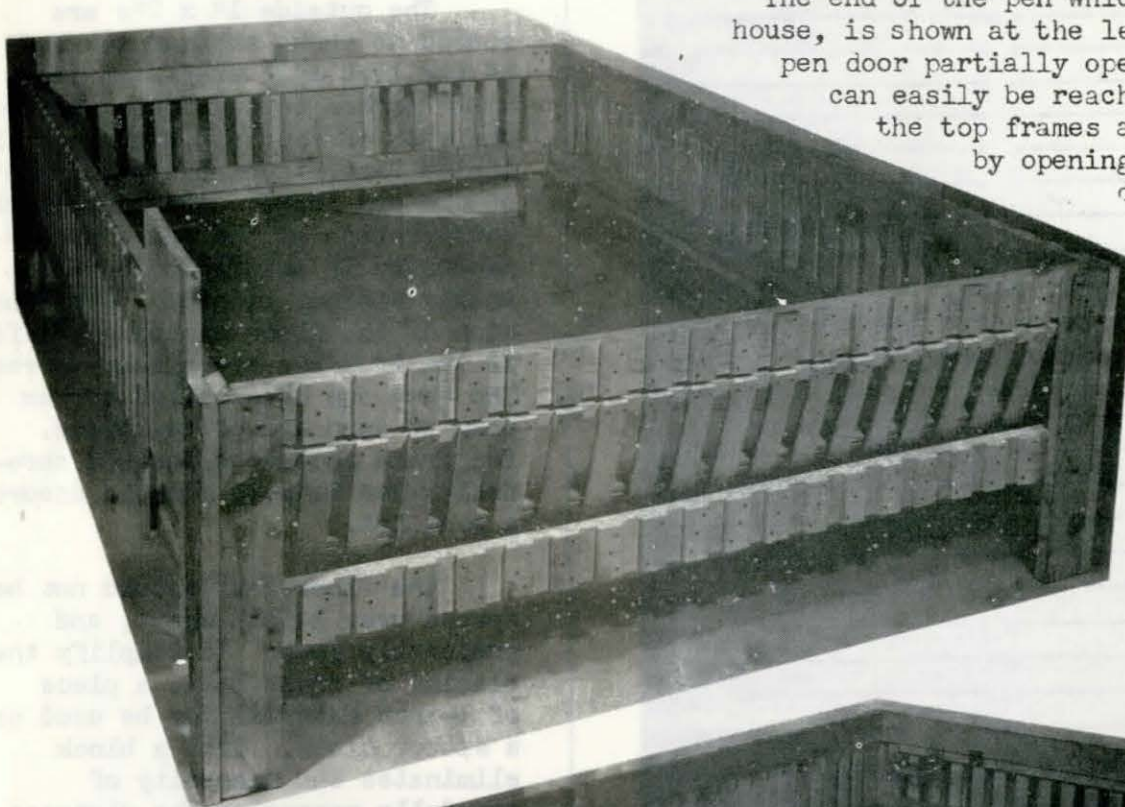
Sliding storm doors are provided to cover the opening in the south wall during adverse weather conditions. The track for these doors is similar to the track for the sliding frame inside.

The front opening is approximately 15" x 15" and the sliding doors are each made of a 17- or 18-inch length of 1" x 10". These doors also may be used to lessen the amount of light entering the house.

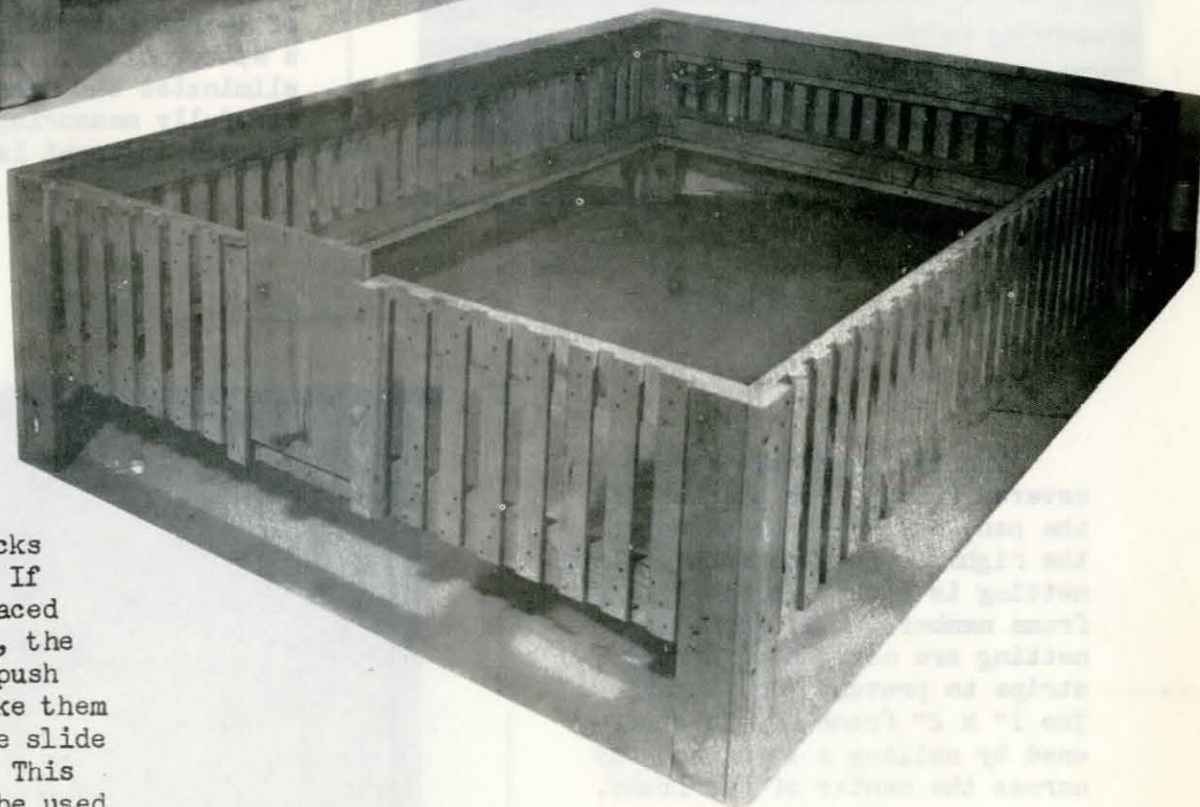
Attention is called to the swinging windows in the sides of the house. These are installed for the convenience of the attendant, and since the openings are not screened they should not be left open.

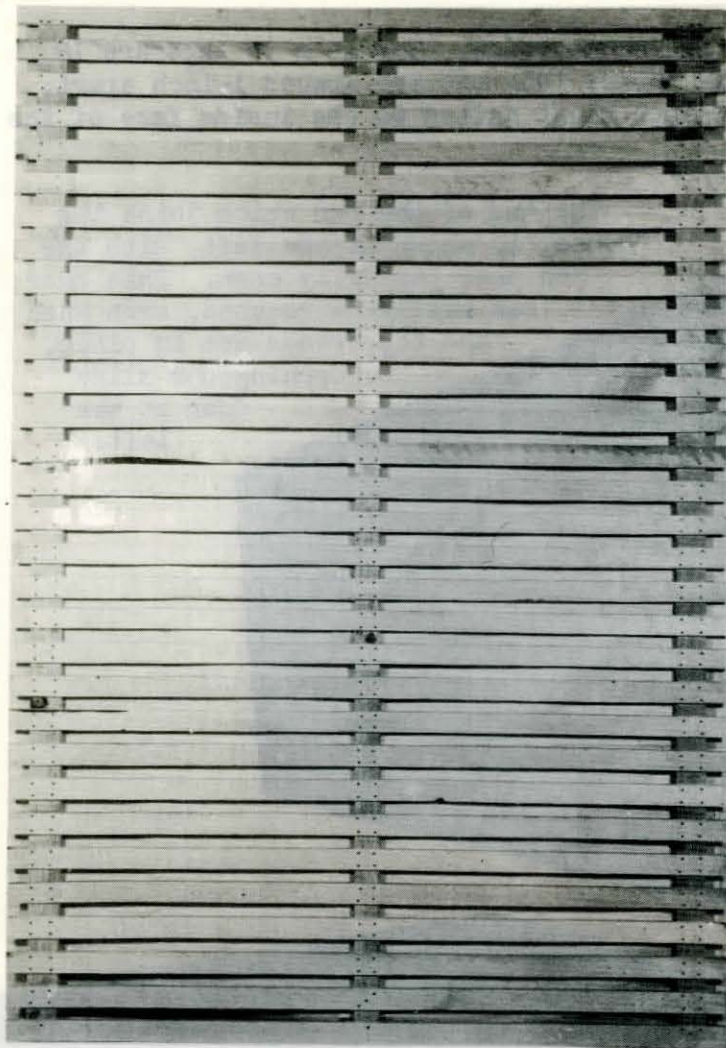
Construction details of the sun pen are shown below. The 1" x 3" legs are 18 inches long. The lath on the sides are 12 inches long and are spaced 1-inch apart. The lath-covered floor frame rests on a 1-inch cleat nailed to the inside face of the bottom horizontal 1" x 3"s.

The end of the pen which joins the house, is shown at the left, with the pen door partially open. This door can easily be reached, even when the top frames are in place, by opening the slide door at the left.



The other end of the pen is shown at the right. Another slide door is placed in the end of the pen to facilitate the removal of chicks if necessary. If feeders are placed in the sun pen, the caretaker can push them in and take them out through the slide door opening. This door also may be used to provide access to another pen if more exercise space is needed.

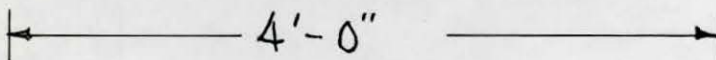




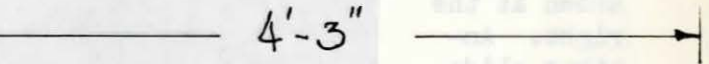
Details of the lath floor for the sun pen are shown at the left. The frame is made of three 1" x 2"s spaced equal distances apart. The center 1" x 2" is needed to prevent sagging.

The outside 1" x 2"s are spaced as shown so that the ends of the lath will extend at least 1 1/2 inches beyond these members. The ends of the lath rest upon the inside face of the bottom 1" x 3"s of the pen frame. Accuracy in the construction of the pen frame is necessary if the floor is to fit snugly without binding. Construction of the floor can be simplified if the 1" x 2"s are placed correctly and then one lath nailed across them at each end of the frame. The frame should be squared carefully when this is done to assure a good fit.

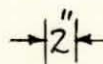
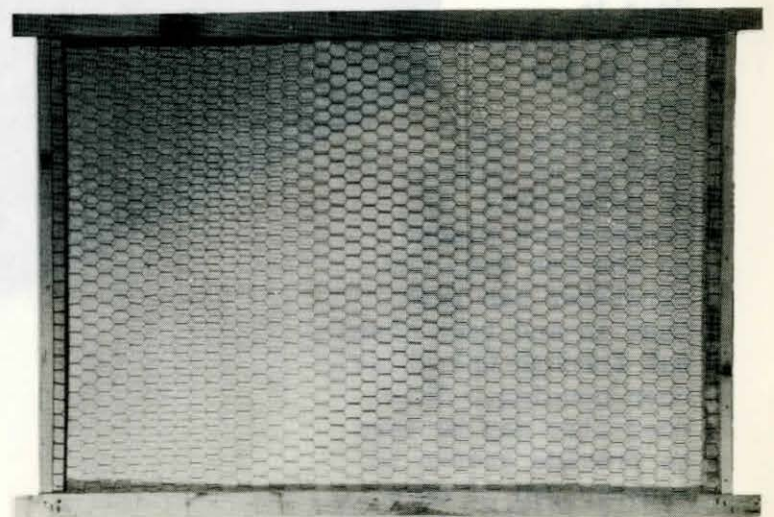
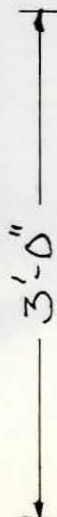
The floor lath should not be spaced over 1-inch apart, and preferably less. To simplify the placing of these lath, a piece of 1-inch material may be used as a spacer block. Such a block eliminates the necessity of carefully measuring the distance between adjacent lath.



6'-0"



The two removable screen-covered frames, for the top of the pen, are built as shown at the right. One-inch mesh poultry netting is tacked to the 1" x 2" frame members. The edges of the netting are covered with wood strips to prevent hand injuries. The 1" x 2" frame may be stiffened by nailing a lath each way across the center of the frame.



Operation and Management Hints

Pilot Light — In some locations it may be desirable to have a pilot light on the outside of the rear of the brooder. This light will inform the operator whether or not the brooder is in operation. The pilot light is wired in parallel with the hover lights and is "on" and "off" with them. It should be located where it can be readily seen.

Thermostat — For most economical operation a thermostat is essential. If one can be obtained it should be mounted within the hover at about chick height and shielded from the direct rays of the lamps.

If a thermostat is not available more attention to the lamps will be required. A supply of 25-watt, 50-watt and 100-watt lamps should be kept on hand. By observing the behavior of the chicks the need for changing to larger or smaller lamps can be determined. If too warm, some of the chicks will settle down to rest outside the curtain. If too cold, they will remain under the hover and huddle together. They may pile up, sweat, and even trample to death some of the less vigorous chicks. Frequent observation of chick behavior is necessary for successful operation without a thermostat.

Caution — A fire hazard exists when wood shavings, commonly used for brooder litter, become packed against lamps of the 50-watt size and larger. As a precaution against this danger, lamps should not be mounted on the rear wall of the hover or in any location where the litter can accumulate. The ceiling of the hover is perhaps the safest place for the heating units. Non-inflammable litter such as sand is an additional safeguard.

Roosts — Chicks 10 days to 2 weeks old often show a desire to roost. This tendency should be encouraged by placing low roosts on top of the hover within the brooder. They may be made of lath nailed to crosspieces of 1-inch material. The roosts need not be more than 2 inches above the hover top. Later, when the hover top is no longer needed, it may be removed and higher roosts installed.

Feeding Light — The chicks should be encouraged to put in long active days eating, drinking and exercising. Twelve to fourteen hours may be considered a good length day. The feeding light supplements daylight and should operate independently of the heating lamps. For convenience, a switch for controlling this light may be mounted within easy reach.

Feeding — For feeding and general care of chicks, see the Nebraska Poultry Manual. This may be obtained from your county agricultural agent, or by writing to the University of Nebraska Agricultural College Extension Service at Lincoln, for Extension Circular 1400.

List of Material

Brooder

10 pcs.	6" T & G flooring	4'-0" long	- floor
11 "	6" "	4'-6" "	roof
4 "	6" "	4'-0" "	hover top
10 "	6" "	1'-8" "	rear wall
10 "	6" "	4'-0" "	side walls
10 "	6" "	2'-4" "	front wall
2 "	1" x 3"	2'-2" "	rear legs
2 "	1" x 3"	2'-10" "	front legs
3 "	1" x 2"	4'-0" "	floor supports
2 "	1" x 3"	4'-6" "	side wall cleats
2 "	1" x 3"	4'-0" "	front and rear cleats
2 "	1" x 2"	2'-6" "	hover top supports
2 "	1" x 2"	1'-8" "	hover top cleats
2 "	1" x 2"	3'-0" "	roof braces
2 "	1" x 3"	4'-0" "	floor cleats
2 "	1" x 3"	4'-6" "	roof cleats
4 "	1" x 2"	1'-0" "	window frame
4 "	1" x 2"	1'-2" "	window frame
4 "	1" x 2"	1'-0" "	window sash
4 "	1" x 2"	0'-10" "	window sash
2 "	1" x 2"	3'-0" "	storm door track
2 "	1" x 2"	1'-6" "	storm door frame
2 "	1" x 2"	4'-0" "	sliding frame track
2 "	1/4" x 1"	4'-0" "	sliding frame track
2 "	1" x 2"	3'-0" "	sliding frame
3 "	1" x 3"	1'-4" "	sliding frame
2 "	1" x 10"	1'-4" "	storm doors
1 "	1" x 6"	3'-6" "	chick door
4 "	1" x 2"	4'-0" "	removable netting covered frame
4 "	1/4" x 1"	4'-0" "	removable netting covered frame
2 "	1" vapor-proofed insulation sheathing	2'-0" x 8'-0"	
3 pair	2" butt hinges	2 pair 4" strap hinges	2 pcs. glass 8" x 9"
18 2"	No. 10 wood screws	1 lb. lath nails	2 lb. 6d box nails
10 screen	door hooks and eyes	2 pcs. canvas 10" x 4'-0"	for Hover curtain
1 pc.	1" mesh poultry netting 1'-6" x 1'-6"		for sliding frame
1 pc.	glass cloth 1'-6" x 1'-6"		for sliding frame
1 pc.	1" mesh poultry netting 4'-0" x 4'-0"		for removable netting covered frame
6	2 pc. combination base porcelain receptacles (concealed terminals)		
15 ft.	No. 14 brewery cord; 2 plug caps; 1 plug body; 4'-0" loom; 3-1/2" pipe straps		
1	switch; switch box and cover; 1 thermostat; 1-1/2" weather-proof head		
1 pc.	1/4" mesh hardware cloth 1'-4" x 1'-4" (for thermostat protection)		
1 pc.	1" x 4" x 4'-0" for mounting heating lamp receptacles		
Rolled roofing to cover 4'-6" x 4'-6"; wood strips for roofing			

Sun Pen

4 pcs.	1" x 4" x 4'-0"	ends
4 "	1" x 4" x 6'-0"	sides
8 "	1" x 4" x 1'-6"	legs
2 "	1" x 10" x 1'-0"	sliding doors
3 "	1" x 2" x 6'-0"	floor cleats
2 "	1" x 1" x 4'-0"	floor supports
2 "	1" x 1" x 6'-0"	floor supports
4 "	1" x 2" x 3'-0"	top frames
4 "	1" x 2" x 1'-0"	sliding door frames
4 "	lath, 1'-0" long	sliding door frames
2 "	3'-0" x 4'-0"	1" mesh poultry netting (for pen top)
1	bundle lath	floor, side walls
1/2 lb.	small galvanized staples	