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Hog Houses for South Dakota

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A 25' x 42' Clay Block Hog House in Kingsbury County, South Dakota

EXTENSION DIVISION
SOUTH DAKOTA STATE COLLEGE OF
AGRICULTURE AND MECHANIC ARTS
C. LARSEN, *Director*

Cooperative Extension Work in
Agriculture and Home Economics,
South Dakota State College and
U. S. Department of Agriculture
Cooperating

Brookings, S. Dak.

Foreword

Good housing is essential to successful hog raising. While several sows may do fairly well with their litters around an old strawstack or shack under favorable weather conditions, it will pay in the long run to figure on good housing and care, if the business is to show the best profit.

The writer has attempted to put as much helpful material in as little space as possible for anyone planning to build a hoghouse. If changes are made in the plan the details and suggestions should still be of service. It is hard to make changes of any consequence in a plan, however, without running in to some difficulty later on in the process of building. If such changes are made it is often better not to try to follow the plan from that point on except as to details.

While one object in getting out the bulletin is to save the necessity of blue prints, blue print plans of any of the houses can be supplied at a cost of 10 cents to cover the cost of printing them.

Essentials of a Good Hog House

The centralized hoghouse is primarily for the brood sow and litter and should provide especially for the young pigs at farrowing time. To afford those conditions necessary to make young pigs thrive the house must be dry, warm, clean, well ventilated and disinfected with direct sunlight. In addition to these, conveniences for feeding and caring for the pigs and permanency of construction are factors to be considered by the builder. The centralized house should come first in this state, using the little movable colony houses as supplementary to it, if desired. An excellent bulletin showing plans and details of construction of colony or movable hog houses may be secured from the Extension Department of the Iowa State College, Ames, Iowa.

Location

Factors to be considered in locating the house are:

Well Drained Location. Not only the house site, but the yard as well should be well drained. Many hog diseases are harbored in the mud holes and spread from them. It may be necessary to lay drain tile around the building site if the natural slope is not good. Farm buildings show up better when set up on good high ground. This is an asset to the farm.

Close to Feed. Unless arrangements are made for storing feed in the house it should be located convenient to the cribs.

Handy to Pasture. The house should be built adjacent to lots to be used for pasture. If the pasture is alfalfa or clover it is good practice to divide it in two parts, pasturing one lot while the other is allowed to "come on."

Handy to Water. Water supply must be considered. However, in many cases it would be a simple matter to pipe the water to the hog lots, rather than to make any sacrifice in location on account of it.

Windbreak. A windbreak is desirable. It should not be within 50 feet of the house on the north or west on account of drifting snow. No tree should be allowed to grow close enough to the house to shade it.

Direction From Dwelling. If avoidable the house should not be located in the line of the prevailing summer winds with the dwelling house, on account of the disagreeable odors.

Material Of Side-Walls

The tendency of farm building construction is toward the permanent materials, especially on farms operated by the owner. This is nothing more than common sense. If the building is not too elaborate it is bound to pay in the long run, as is borne out by history. When the farm becomes a permanent thing it should support permanent buildings. The demand for permanent building material is moving westward every year.

The most economical materials for permanent farm buildings in South Dakota are hollow clay blocks, concrete and cement products. Where good gravel can be obtained quite close concrete is the most economical material to use in most cases. The walls of any of the types of houses shown can be built readily of concrete. Where the gravel is poor or there is a long haul, hollow clay blocks will prove a feasible material for buildings. It is especially good for hog houses and reasonable in cost. The best grade of 5"x8"x12" blocks should be laid down at stations in the eastern part of the state for \$63 to \$70 per thousand pieces. A thousand pieces will build either of the houses shown of clay blocks 70 feet long. Lumber can be used for the walls of either house if desired, having an advantage in quick construction. If lumber is used it should be kept well painted. If properly ventilated the double wall is recommended, sheathing the inside with matched lumber.

Materials For Roof

If provision is made for ventilation it is good practice to sheath the roof with matched lumber and shingle or cover with the best grade of prepared roofing guaranteed for a long period of years. The wind is hard on prepared roofing after it begins to loosen. Prepared roofing is good for use on a flat roof. Shingles should be laid 4 inches to the weather.

Materials For Floors

Concrete floors when properly installed and kept well bedded are satisfactory. The proper method of installation is shown in the cross section drawings. No part of the floor should be exactly level and the surface should not be trowelled smooth with a steel trowel. The wood float will leave a floor roughened to prevent slipping. The grooves shown in the floor plans are put in with a half-inch iron rod or bolt bent so as to make a smooth shallow groove when drawn along the edge of a board used for a straight edge. The grooves should be drawn from four to six inches apart and will help in keeping the floor dry. The concrete will usually be ready to groove an hour after pouring. Keep the rod wet while using. Concrete is easy to clean and easy to disinfect. False floors of inch lumber are used by some breeders over these concrete floors, but most of them have discarded these as unnecessary. In sections near to clay block factories, where the freight expense is little, it is a common practice to imbed cull hollow clay blocks in the concrete floor for a dead air space. Where freight rates are prohibitive the next best plan is to lay down good coarse road gravel under the floor.

Cork brick and creosote wood blocks are satisfactory but are expensive and difficult to install.

A satisfactory mixture for pouring a one-course floor of concrete 1-3-5 (one part of cement, by measure, to three parts of sand

and five parts of coarse gravel or crushed rock.) Many builders want to use pit-run sand and gravel without screening the gravel from the sand. The safe mixture you can use with pit-run gravels varies extremely in South Dakota. Pits at a few points in the state containing a large amount of coarse gravel can be safely used 1-6, (one part of cement to six parts of pit-run gravel), while others containing three-fourths or more sand must be mixed as rich as 1-4. It is better to be safe than sorry. An extra dollar's worth of insurance put into cement for floors and foundations is likely to save a hundred in a few years from now.

Materials For Foundation

Concrete is recommended for foundations especially in masonry construction, and greater care should be used in expanding the trench for footings at the bottom and putting them down well. Three feet and a half is none too deep for a masonry building, while two feet will suffice for framed structures. A mixture of 1 to 5 pit-run gravel (see paragraph on floors) should be safe unless the gravel is very poor. If the gravel is screened, a 1-3-6 mixture will be satisfactory and save cement. No rocks in the gravel larger than half the diameter of the wall should be used. Rocks thrown into a foundation after the concrete is poured should have water dashed over them before being put in.

An eight-inch foundation is plenty wide and it pays to use care and undergo some inconvenience when digging the trench to keep it within this width after it is trimmed down.

Lighting

There is little danger of putting too much glass in this type of house. Direct sunlight on the floor and alley, not only keeps the house warm and dry but destroys all disease germs. The windows are placed so as to cover as much of the floor as possible at some time during the day. The skylight windows are more efficient in furnishing both light and direct sunlight to the house. The fronts of the pens and the partitions cut off considerable direct sunlight at best. They should not be built any higher than necessary on that account and the front of the pen should be as open as possible.

Ventilation

Houses built with tight sidewalls need more ventilation than mere aerators on top. If no openings are left for fresh air to come into the house little foul air will be forced out. Fresh air flues are shown in several of the plans so constructed as to prevent draught on the pigs. These are recommended for all types of houses, except a house with single wall as shown in Plan E. Dampers are provided to regulate this inflow of fresh air according to the number of hogs shut up in the house. The need of ventilation will of course, be greatest in cold weather when the house is crowded. The King system of foul air flues does not work as efficiently in a

hoghouse owing to the shortness of the flues but as it conserves the warm air, it is recommended as shown in the plan of the "Dakota" house with a register at the roof which may be opened when the circulation is not vigorous enough. If the house is kept well filled with hogs in cold weather the foul air flues and aerators on top will make a satisfactory system. If no fresh air inlets are provided the writer would not advise building the house too warm.

Feed Storage

The most economical way of storing feed is over-head, but to do this the breeder must sacrifice sunlight. One or both of the north end pens are often used for feed or an addition may be built on the north end of the farrowing house as elaborate as desired.

Pig Fenders

Many breeders recommend the use of pig-fenders for protecting the very young pigs. The details and method of fastening are shown for the partitions in fig. 25, and for sidewalls in fig. 2. The rails may be taken off when the pigs are old enough. Some breeders do not put them in all the pens.

Size of the House

The size of the house will of course depend on the number of pens needed. Since the width is standard, it will simply vary in length according to the number of pens desired, allowing six feet in length for each pair of pens. Such slight changes in the plan as may be necessary for a difference in length can easily be figured and any length building built from any plan shown. The width of the house may be made 26 feet and thus increase the width of the alley if desired. For north and south houses the location of the skylights need not change. For the east and west house the windows in the roof should be raised if the width is increased.

Partitions

Breeders are generally agreed that the partitions between the pens should be solid to prevent the fretting of the sows in adjacent pens. Since all partitions tend to shut off some of the direct sunlight they should not be made higher than is absolutely necessary. Two methods of fastening the partitions that are giving the best satisfaction are shown in this bulletin, one is shown in detail in fig. 24, and the other method is shown in the cross-section in fig. 9.

Types of Buildings

The gable-roofed type of house, with low sidewalls and a small amount of overhead space is becoming more popular each year. Plans are shown of this type of building for both north and south, and east and west houses and for both masonry and frame construction. The clay block house is shown 25 feet wide because the extra foot in width is gained in the mortar joints and when concrete is used for the walls the same width is recommended. For a frame house 24 feet or 26 feet works up better in construction.

(sometimes known as hollow tile.) The blocks are 5"x8"x12" best grade hard burned clay block, laid on edge making a five inch double wall. An eight inch wall may be had if desired by laying the blocks flat. It will take about one-half more blocks to build the eight inch wall. The five inch wall is absolutely satisfactory if carefully laid and pointed up. The mortar used should not run over 20% lime to 80% cement. The blocks made by different brick and tile factories vary somewhat in design but all furnish a dead air space in the wall that insures a warm building if carefully laid.

The type of block shown in fig. 1 is made by the Mason City Brick and Tile Company, Mason City, Iowa. Good blocks can be secured today from nearly any brick and tile company that makes other reliable clay products and can often be had at your local lumber yard. The companies will also sell direct from the factory and quote prices laid down at your station. It is better to buy of the local dealer when possible. Corner blocks should be ordered as shown in the bill of material. Other companies known to be making a specialty in clay block building materials are: Adel Clay Products Company, Adel, Ia.; A. C. Ochs Brick & Tile Company, Springfield, Minn.; Johnson Bros., Clayworks, Ia.

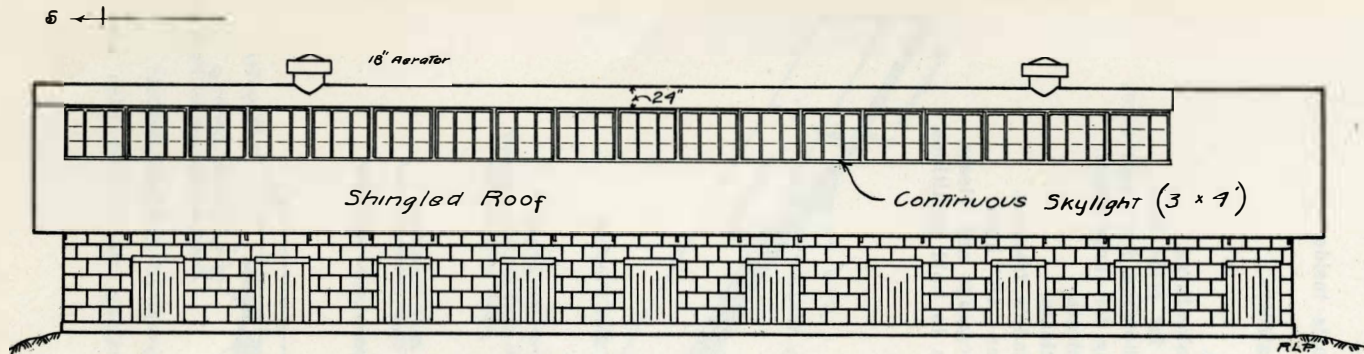
Concrete makes a very good wall for this building and is easy to pour. Write for valuable information regarding concrete construction to American Portland Cement Association, 111 West Washington St., Chicago, Ill.

Lighting

Direct sunlight comes thru the skylights in the roof and small windows in the ends. These continuous skylights extend along the ridge on both the east and west side of the roof. The house sets north and south. Details showing how the skylights are framed are shown in fig. 6. Hot bed sash 3'x4' with double strength glass are used. They should not cost over two dollars each laid down to you. If your local dealer cannot supply you with this sash, write in for names of manufacturers. Some of these sash should be equipped to raise as shown in fig. 6 for summer ventilation. The rest may be screwed down tight. The number so equipped will vary with the builder, hence this equipment is not included in the bill of material. While many of these houses have been in use in other states without protection from hail, it is recommended that the west lights, at least, be protected with 1-2" to 1-3" mesh hardware cloth in South Dakota. This material will cost from 8 to 10 cents per square foot.

Ventilation

The system of ventilation is not shown in fig. 2. The fresh air flues are located in the floor plan fig. 5 and are installed exactly as shown in Plan B. fig. 7. If it is desired to conserve the heat install the foul air system also as shown in the same figure, using the same sized flues.



EAST ELEVATION "IOWA SUNLIT" PLAN

Fig. 4—Looking at the side of the building shown in Fig. 2 and 3 the roof is the common gable-roof. The west side is exactly the same.

IOWA SUNLIT

25'x60'

Estimated Bill of Material

Masonry

800—5"x8"x12" hollow clay blocks for wall, selected at \$65.00 per 1000 in car lots.

80— $\frac{1}{2}$ blocks of the above.

84—common brick for corners or 30 corner blocks (some factories make regular hollow clay corner blocks for this)

2—bbls. lime.

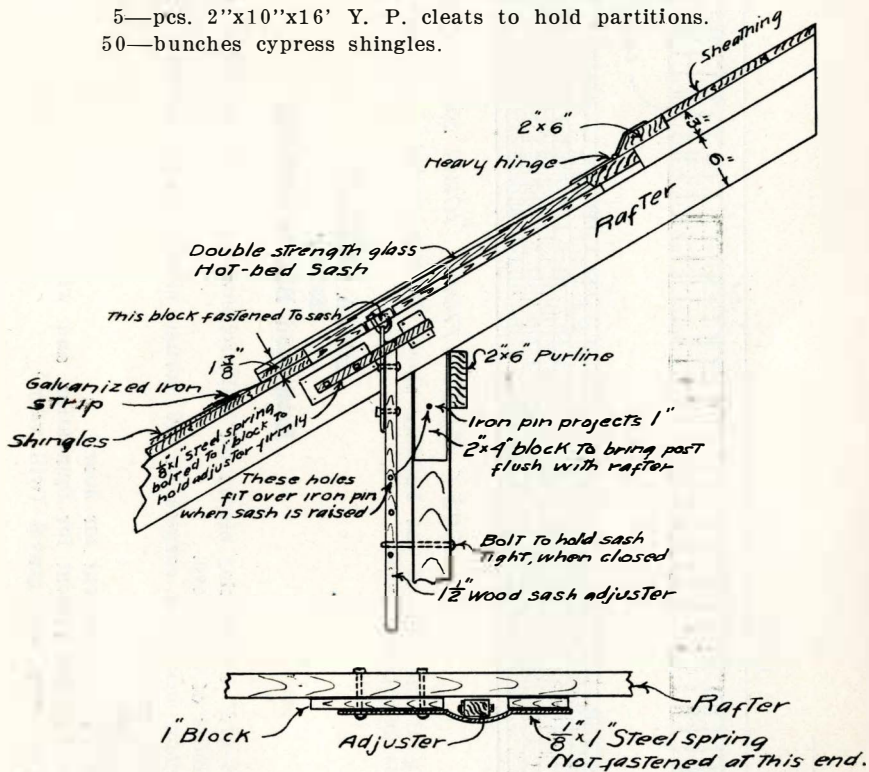
28—bbls. Portland cement for floor.

39—bbls. Portland cement for foundation and walls.

49—cu. yds. sand and gravel (will vary.)

Lumber

- 10—pcs. 4"x4"x8' for 4' gate posts inside.
- 18—pcs. 4"x4"x10' fir posts.
- 10—pcs. 2"x6"x12' yellow pine girders.
- 240' of 2"x6" yellow pine plates.
- 42—pcs. 2"x6"x16' Y. P. rafters.
- 1700' of 1"x8" shiplap Y. P. for sheathing.
- 20—pcs. 1"x6"x12' No. 2 W. P. for cross ties.
- 20—pcs. 1"x6"x14' White Pine flooring for small door.
- 18—pcs. 1"x6"x14' W. P. flooring for large doors.
- 9—pcs. 1"x8"x16' W. P. door cleats.
- 10—pcs. 1"x6"x16' W. P. door cleats.
- 200' 2"x6" Y. P. for door and window framing.
- 640' of rough lumber for partitions—40" high.
- 20—pcs. 1"x4"x14' W. P. door casings and cleats.
- 5—pcs. 2"x10"x16' Y. P. cleats to hold partitions.
- 50—bunches cypress shingles.



SIDE VIEW OF SPRING SHOWN ABOVE

Fig. 6—Details of the manner of hinging the hotbed sash and equipping with sash adjuster.

Windows

- 36—3'x4' hotbed sash at \$1.75 double strength glass.
- 6-4, pane (10"x12") barn sash.

Screen

- 216 sq. ft. of 1-3" mesh screen to protect west skylights.

Fresh Air Flues

See bill of material for Dakota Hoghouse.

Aerators

- 2—18" galvanized iron aerators.

Hardware

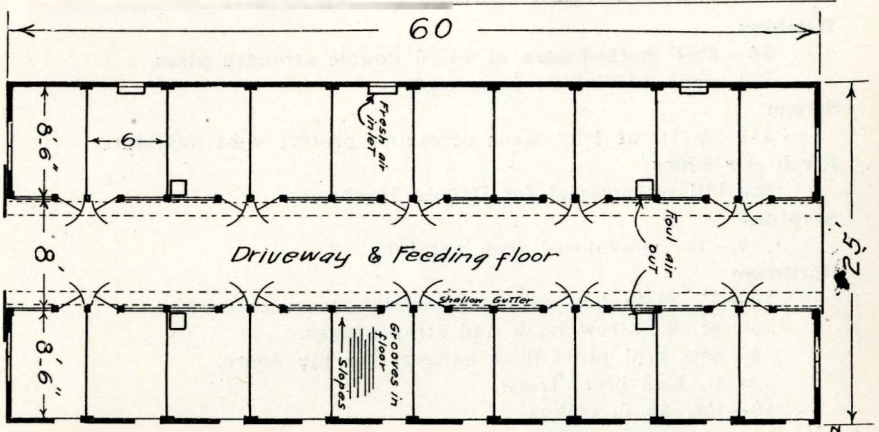
- 20—6" chain bolt locks for outside doors to pens.
- 20—pr. 8" screw hook and strap hinges.
- 4—sets bird proof door hangers for big doors.
- 32—ft. bird proof track.
- 10—lbs. 20 d. spikes.
- 15—lbs. 10 d. nails.
- 50—lbs. 8 d. box nails.
- 60—lbs. shingle nails.
- 36—1-2"x7" bolts for partition cleats.
- 20—5-8"x12" bolts for plates.
- 20—cast iron sockets to fasten short gate posts to footing.
- 18—5-8"x12" bolts for footings.
- 40—small pulleys for opening doors.
- See bill of material for pig fenders.
- See bills of material for pen front, screws, small bolts, etc.

PLAN B.—THE DAKOTA HOGHOUSE

While the north and south skylight house has the advantage over all types for securing direct sunlight to all parts of the floor, many breeders prefer the east and west house for winter use. The sun rays do not reach all parts as well but are more direct. The following plan shows the gable roof house set east and west with skylights in the side wall and the south roof, only.

Materials

The walls are constructed of 5"x8"x12" hollow clay blocks (see fig. 1) the same as shown in, and discussed under Plan A. The five inch wall is shown eight courses of blocks high. The south wall above the line of the doors is of concrete because of the wall being so broken up with windows. The wall will not be hard to pour as the frames of the windows will be set in and help hold the forms. The forms must be braced extremely solid before beginning to pour the concrete. Sheathing for the roof can be used for forms. Bolts $\frac{5}{8}$ "x12" should be embedded in the joints between the last course of blocks and the door frame to extend up into the concrete between each window to strengthen the bond between the blocks and concrete wall. These could not be shown in the cross section. Spike should be driven into the window frames (see fig. 13) to hold them in place.

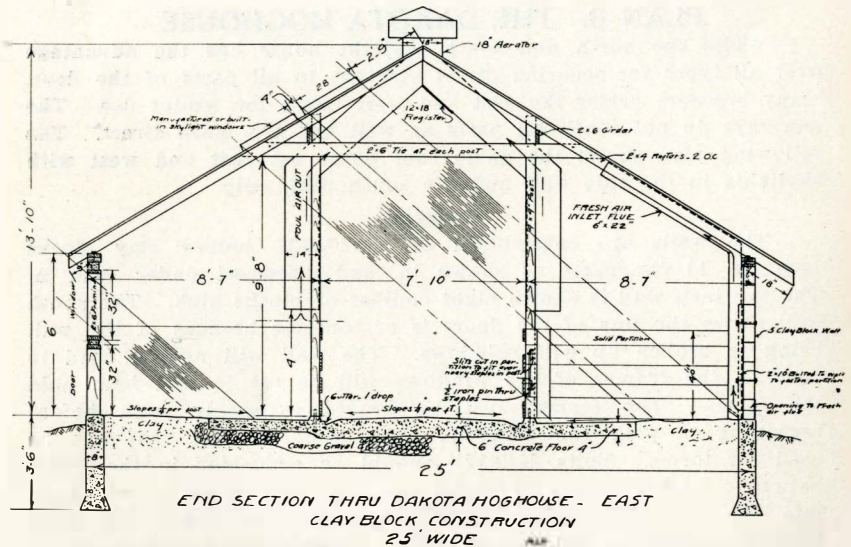


"DAKOTA HOUSE FLOOR PLAN
Fig. 8

The concrete for this wall should be made from screened sand and gravel and mixed 1-2-4 (one part of cement, to two parts of sand, and four parts of gravel by measure.) Bolts $\frac{1}{2}$ "x8" for holding the plate, must be embedded in the top of the concrete wall and in the joints of the top row of blocks every ten feet.

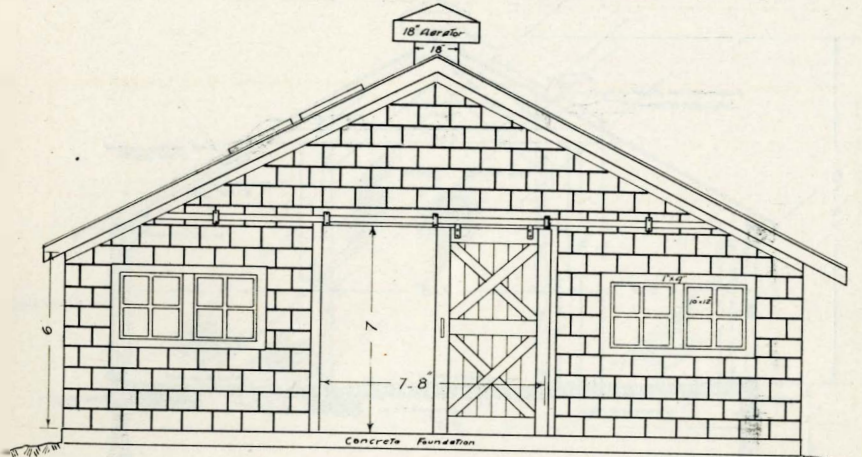
Lighting

The south pens receive direct sunlight thru the windows in



END SECTION THRU DAKOTA HOGHOUSE - EAST
CLAY BLOCK CONSTRUCTION
25' WIDE

Fig. 9—Showing the method of framing and also a complete system of ventilation with both fresh air and foul air flues. The suns rays are shown for the middle of March, Lat. 44° north.



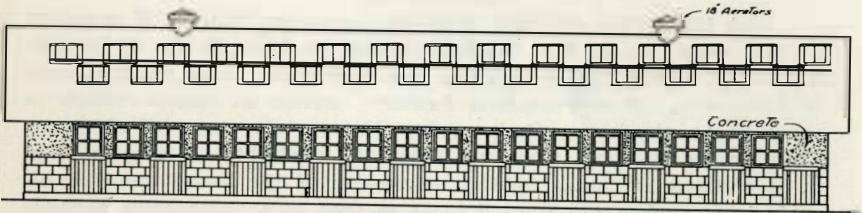
EAST-ELEVATION "DAKOTA HOG-HOUSE"

Fig. 10—The west elevation of this house will be exactly the same.

the side wall and the north row from the skylights in the roof. The windows in the roof are of the standard commercial size and may be obtained at any lumber yard or other local dealer. They are placed in a double row in order to provide for sunlight on the floor of the pens in winter as well as in the spring. The standard size of these windows is 20"x28". Longer windows will be made to order by some of the manufacturers at a reasonable cost. The south eave is very narrow in order



NORTH ELEVATION



SOUTH ELEVATION "DAKOTA HOG HOUSE"

Fig. 11—The south row of pens are lighted by the windows in the side, the north row by the skylights. The lower row of skylights will throw sunlight into the north pens in winter.

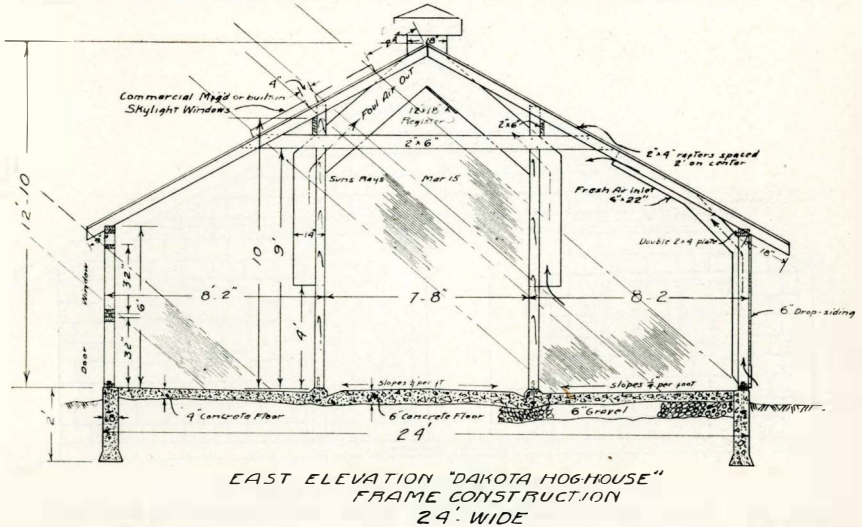


Fig 12—This cross section is to be used with the preceding plan only when it is constructed with lumber. The placing of the skylight windows differs from that in the 25-foot house.

that no direct sunlight will be cut off in the winter and early spring. The cornice is left open, that is there is no facing used on the end of the rafters for the same reason.

Ventilation

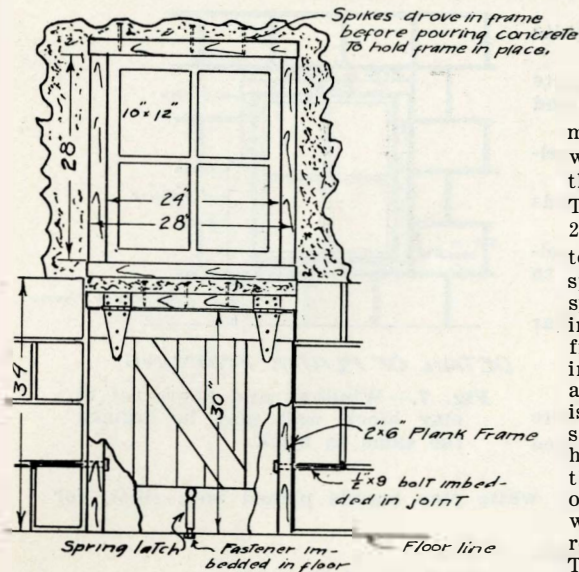
The building is shown with the complete ventilation system. The location of the flues is shown in the floor plan, fig. 8, and in the cross-section drawing, fig. 9. Details of construction for the foul air flues, are shown in fig. 23. The installation of the fresh air flues and aerators is essential in this house. If it is not necessary to conserve the warm air the foul air flues may be omitted.

The size of the foul-air-flues and aerators is figured on the basis of one square foot in cross-section area for each 12 head of mature hogs or their equivalent. The system should provide for the maximum number that might be shut up in cold stormy weather.

Alternatives

The continuous skylight windows shown in Plan A, if installed in the south roof of this building, makes an ideal house for winter and early spring, and is slightly less expensive. The building will be too warm for mid-summer, however, unless an inside curtain is provided to check the sun's rays. The curtain may be of cheap cloth drawn on wires close up under the skylight. It may be put in in sections 12' long running lengthwise of the house and can be pushed back when not wanted same as that in a photograph gallery.

If the building is built of lumber the cross section plan (fig. 12) may be followed and the nine light dairy sash shown in Plan D. may be substituted for the south side wall.



**Detail of Door
(Inside View)**

This shows a simple method of framing the windows and doors in the "Dakota" house. The frames are made of 2x6 yellow pine nailed together with 20 d. spikes. Two or three spikes should be driven in the sides of the frame to be imbedded in the concrete as well as in the top. The door is the same type as shown in plan A. It is hinged at the top and the spring latch may be operated from the alley way by attaching small rope as shown in fig. 2. The hinges should be greased if they do not work freely.

**DETAIL OF DOOR (INSIDE VIEW)
WINDOW SET IN CONCRETE WALL**

Fig. 13—Showing the method of framing in the south wall of the "Dakota Hog House."

**DAKOTA HOGHOUSE
25'x60'**

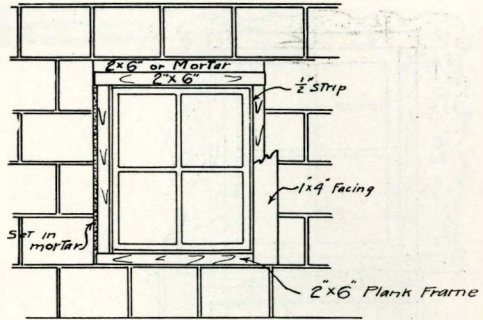
Masonry Estimated Bill of Material

- 650—5"x8"x12" hollow clay blocks for walls, selected at \$65.00 per 1000 in car lots.
- 40—1-2 blocks of the above.
- 30—corner blocks of the above or 84 common brick.
- 2—bbls. lime.
- 22—bbls. Portland cement for floor.
- 41—bbls. Portland cement for foundation, footings, mortar.
- 47 cu. yds. clean sand and gravel.

Lumber

- 18 pcs.—4"x4"x11' 3" fir posts.
- 10 pcs.—4"x4"x8' fir posts for short gate posts.
- 10 pcs.—2"x6"x12' yellow pine girders.
- 240 ft.—2"x6" yellow pine for plates.
- 124 pcs.—2"x4"x16' yellow pine rafters.
- 1800 ft.—1"x8" shiplap for sheathing.
- 20 pcs.—2"x6"x12' No. 2 yellow pine for cross ties.
- 20 pcs.—1"x6"x14' white pine flooring for small doors.
- 16 pcs.—1"x6"x14' white pine flooring for large doors.

- 18 pcs.—1"x6"x16' white pine door cleats.
- 20 pcs.—1"x4"x14' white pine door casings and cleats.
- 24 pcs.—2"x6"x16' yellow pine plank framing.
- 640 ft. rough barn boards for partitions, etc.
- 5 pcs.—2"x10"x16' yellow pine cleats, bolted to wall for partitions.
- 57 bunches Star A. Star red cedar shingles.



DETAIL OF PLANK FRAMING

Fig. 7.—Windows and doors set in clay block wall may be framed the same as brick.

Ventilation

- 4 pcs.—1"x4"x14' white pine barn boards planed both sides.
- 4 pcs.—1"x12"x14' white pine boards planed both sides, for foul air flues.
- 2 cast iron registers, 12"x18".
- 3 pcs.—10"x24" screen wire inlets, 1-3" mesh.
- 6 pcs.—1"x12"x12' white pine barn boards for fresh air flues.
- 2 galvanized iron aerators, 18 inch.

Windows

- 26—4 pane (10"x12") barn sash.
- 29—24"x28" sky light windows, at \$3.00.

Alternative

- 20—Hotbed sash at \$1.75 with roof framing shown in Iowa Sunlit plan may be used in place of the above.

Hardware

- 20—6" chain bolt locks for outside doors shown in fig. 13.
- 20 pr. 8" screw hook and strap hinges.
- 4 sets bird proof door hangers for big doors.
- 32 ft. bird proof track.
- 10 lbs. 20 d. spikes.
- 15 lbs. 10 d. nails.
- 50 lbs. 8 d. nails.
- 44 1-2"x8" bolts for partition cleats and plates.
- 20 5-8"x12" bolts for plates.
- 38 5-8"x12" bolts for footings and south wall.
- 20 cast iron sockets to fasten short gate posts to footings.
- 40 small pulleys for opening doors.
- 70 lbs. shingle nails.
- Screws, small bolts, etc.
- See bill of material for pig fenders.
- See bill of material for pen fronts.

PLAN C.—NORTH AND SOUTH FRAME HOUSE

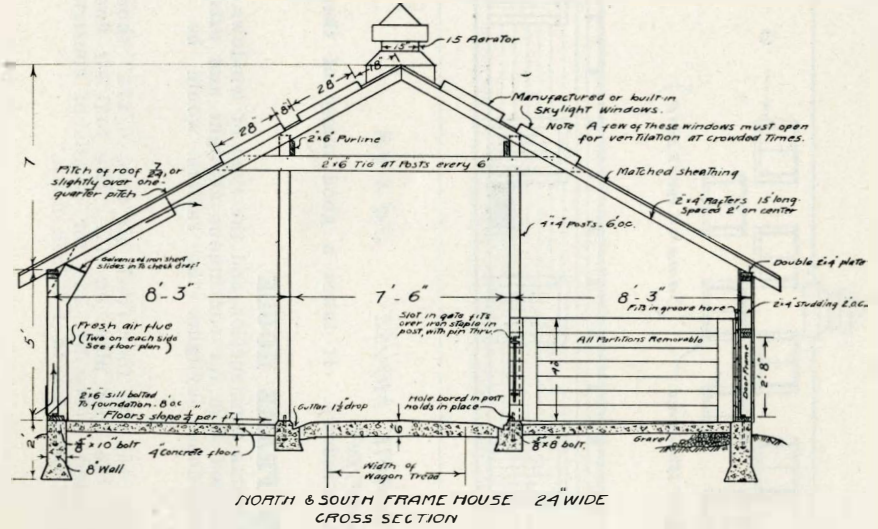


Fig. 14—Showing the method of framing.

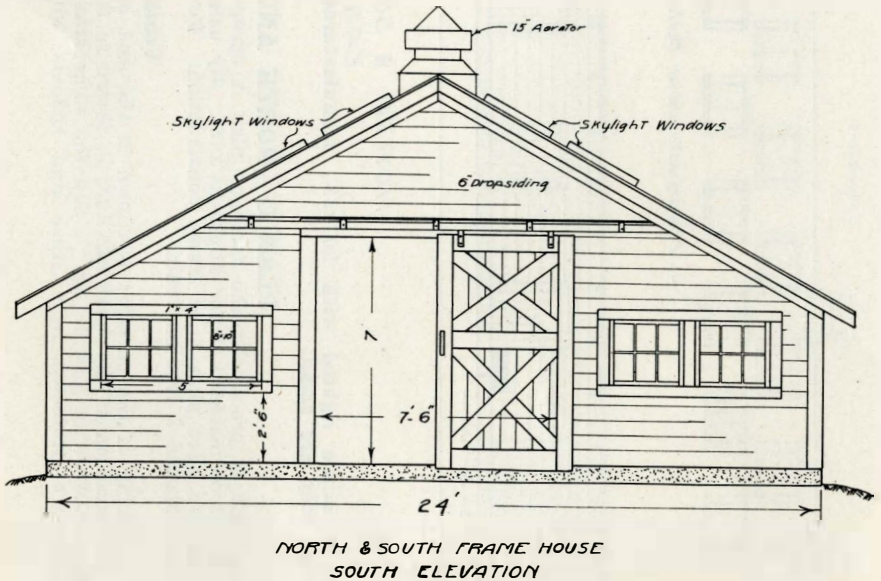
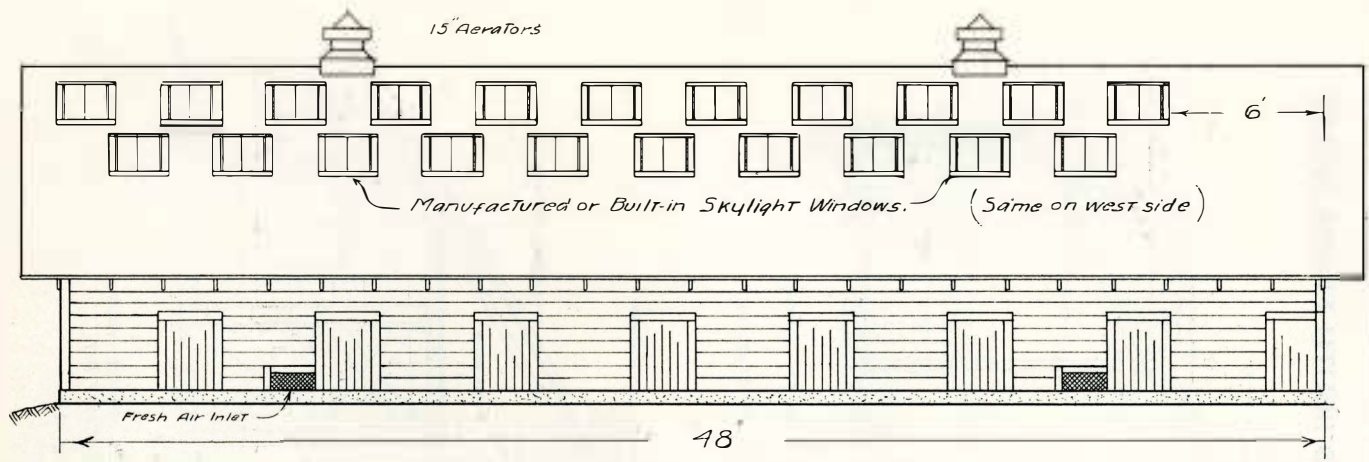


Fig 15



NORTH & SOUTH FRAME HOUSE 24 x 48
 EAST ELEVATION

Fig 16—A house lighted with 20"x28" manufactured skylight windows. It takes a good many of them because they are small.

PLAN C.—NORTH AND SOUTH FRAME HOUSE

This plan is practically the same as plan A except for the frame construction and the type of windows. The plan and bill of material is for house 24'x48'. By using the hot bed sash for continuous skylight and extending the eaves you have plan A of frame construction. For the continuous skylights the rafters would be 2"x6" yellow pine spaced 3 feet on center.

Ventilation

The placing of the aerators is shown in the east elevation fig. 16, and four fresh air flues 6"x22" should be used. The location of the fresh air flues is shown in the walls of the floor plan, fig. 17. The foul air flues are installed as shown in plan B, fig. 9, and the same sizes recommended. (See fig. 23) for details of construction. The inlets are protected from trash and rodents with hardware cloth 1-2 to 1-3 inch mesh.

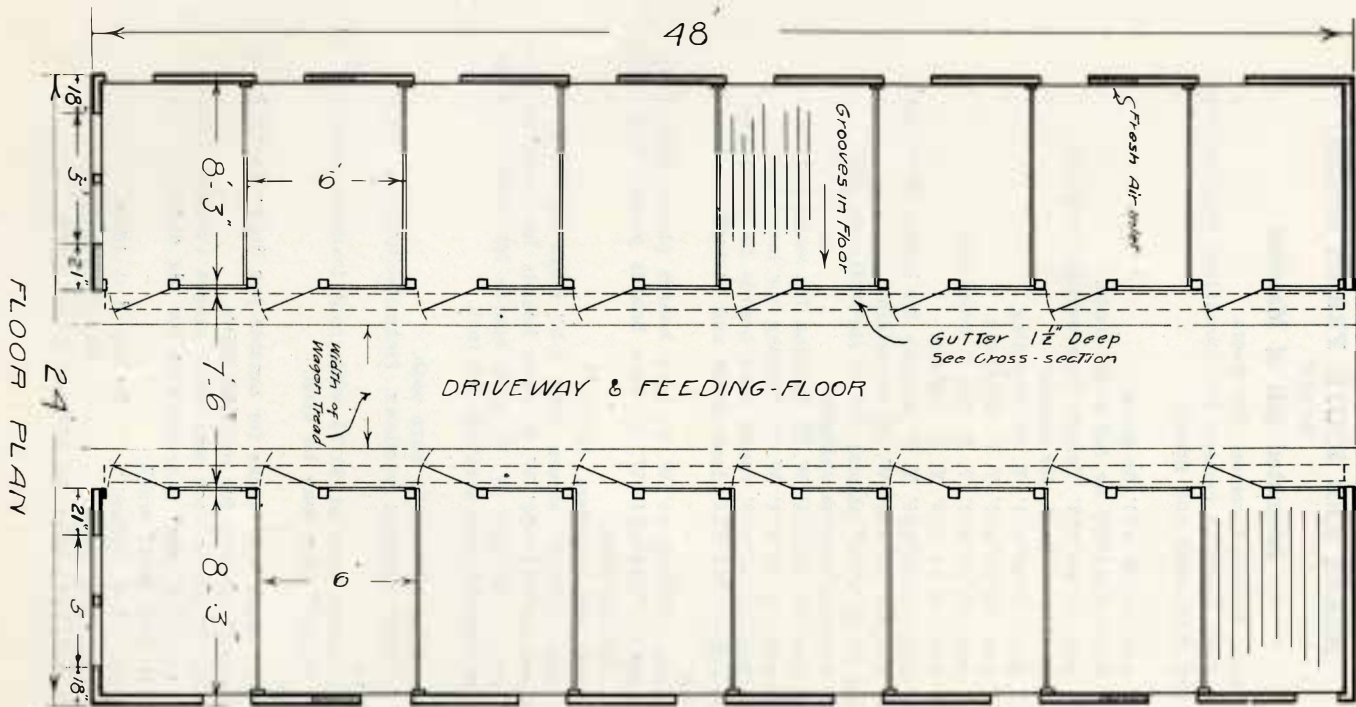


Fig. 17—This floor plan 24'x48' furnishes 16 pens. The pens are deepened at the expense of the driveway.

NORTH AND SOUTH FRAME HOUSE**24'x48'****Estimated Bill of Material****Masonry**

- 17 bbls. Portland cement for floors.
- 10 bbls. Portland cement for foundation and footings.
- 27 cu. yds. sand and gravel.

Lumber

- 14 pcs.—4"x4"x10' fir posts.
- 8 pcs.—4"x4"x8' fir for short posts.
- 20 pcs.—2"x6"x12' Yellow Pine purlines and sills.
- 192 ft. 2"x4" Y. P. for plates.
- 17 pcs.—2"x4"x14' Y. P. studding.
- 20 pcs.—2"x4"x12' Y. P. studding.
- 7 pcs.—2"x6"x12' Y. P. No. 2 cross ties.
- 98 pcs.—2"x4"x16' Y. P. rafters.
- 82 pcs.—1"x8"x16' Y. P. shiplap for inside sheathing.
- 94 pcs.—1"x6"x16' W. P. dropsiding.
- 1260 ft. of 1"x8" shiplap No. 2 sheathing on roof.
- 45 bunches cypress shingles.
- 16 pcs.—1"x6"x14' W. P. flooring for small doors.
- 18 pcs.—1"x6"x14' W. P. flooring for large doors.
- 40 pcs.—1"x8"x16' rough barn boards for partitions.
- 16 pcs.—1"x4"x16' door cleats and casings.

Ventilation

- 4 pcs.—1"x14"x14' W. P. barn boards planed both sides.
- 4 pcs.—1"x12"x14' W. P. barn boards planed both sides for foul air flues.
- 2 cast iron registers, 12"x18".
- 4 pcs.—10"x24" screen wire, 1-3" mesh for inlets.
- 8 pcs.—1"x12"x12' W. P. barn boards for fresh air flues.
- 8 pcs.—1"x6"x12' W. P. barn boards for fresh air flues.
- 2 galvanized iron aerators, 15 inch.

Windows

- 8—4 pane (10"x12") barn sash.
- 42 24"x28" sklyight windows, (manufactured) at \$3.00.

Alternative

- 28—Hotbed sash at \$1.75 with roof framing shown in 'Iowa Sunlit' plan may be used.

Hardware

- 16—6" chain bolt blocks for outside pen doors shown in fig. 13.
- 32—small pulleys for opening doors.
- 16 pr. 8" screw hook and strap hinges (outside doors.)
- 4 sets bird proof door hangers for big doors.
- 32 ft. bird proof track.
- 10 lbs. 20 d. spikes. 80 lbs. 8 d. nails.
- 25 lbs. 10 d. nails. 55 lbs. shingle nails.
- 14—5-8"x12" bolts for footings under posts.

16—5-8"x10" bolts for sills.

20 cast iron sockets to fasten bottom of small posts, screws, staples, small bolts, etc.

See bill of material for pig fenders.

See bill of material for pen front.

PLAN D.—HALF-MONITOR HOUSE

The half-monitor is a standard type of hoghouse and is preferred by many hog raisers. The plan shown is for a house 24 feet wide by 48 feet long. The length can easily be changed to suit the builder. This plan simplifies the construction as much as possible and at the same time provides for the greatest amount of sunlight with a minimum amount of over head space. The plan may be modified by building the notch into the roof on a slant so that the windows in the notch will set more nearly perpendicular with the sun's rays, but it is a question whether the advantage thus derived will offset the weakening of the structure and the increased labor of building.

Framing

On account of the nine light dairy sash being used in the notch in the roof every other 4"x4" post at the pen corners only can run the full 12 feet. The others should be cut off where the lower header goes across for the windows. Triple short studding should be used between each window where the long post does not extend clear up. Cross ties between posts at each six feet should be used. These are not shown in the cross section. (See fig. 19.) Open cornice is shown to prevent cutting off the sunlight on the south.

Notice that the pens on the south are 10 inches deeper than those on the north. (See fig. 21.)

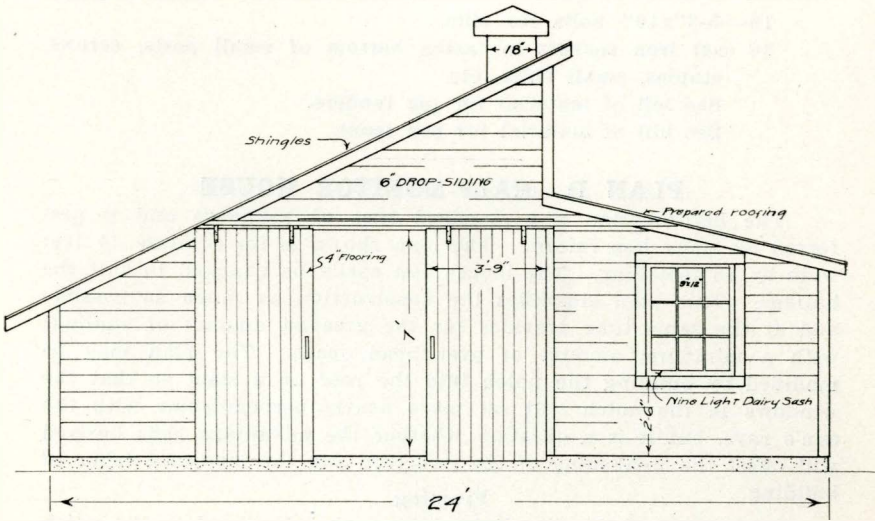
Lighting

The nine light dairy sash shown in the south elevation are necessary to light the half-monitor house as it should be for winter and early spring. The lighting would be improved if the whole roof of the building were raised a half foot, raising all windows with it. It would of course, increase the over head space that much. The windows are placed so near the doors of the pens in the side wall in order to bring them nearer to the center of the pen. Otherwise the sunlight would fall on the partition between the pens during most of the afternoon. Another window might be placed in each end north of the big doors if desired. (See fig. 18.)

Ventilation

The south elevation (fig. 20) shows two 18 inch low type aerators on top, located as shown. This size is also sufficient for a sixty foot house and in case the forty-eight foot house is not to be over crowded, 15 inches will be large enough. Three fresh air flues are called for, located in floor plan, fig. 21. Note the galvanized iron sheet for checking draft. It can very readily be made to rotate within the flue like the check draft in a stove pipe.

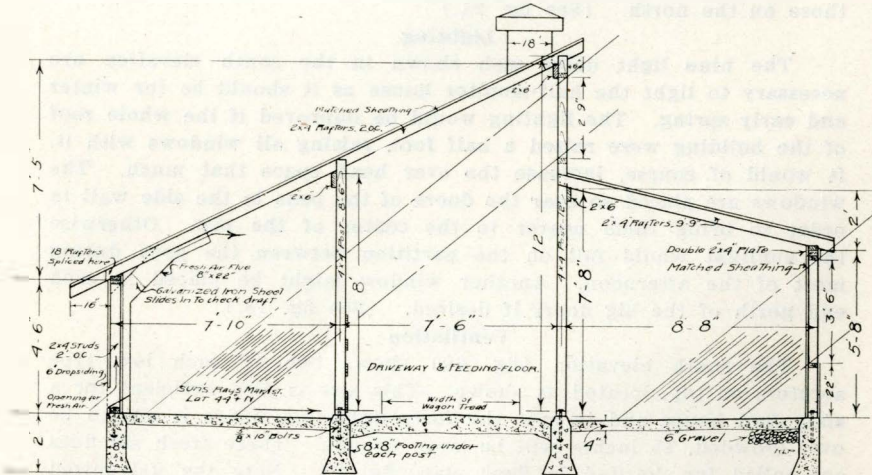
No foul air flues are shown in the plan, but may easily be installed to conserve the warm air. A single flue 10"x22" should run



WEST ELEVATION (Half-monitor Type)

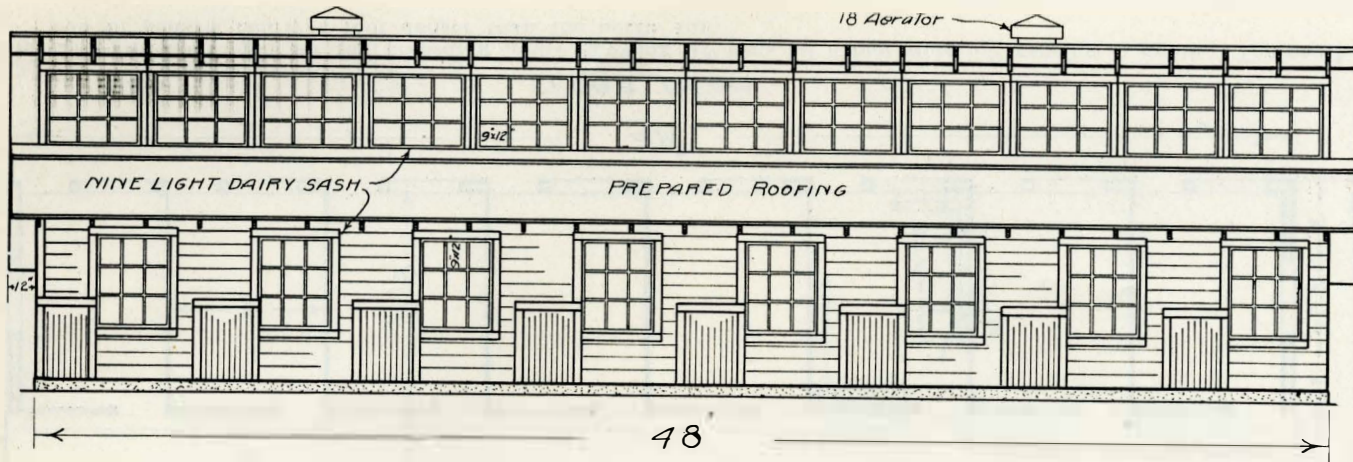
Fig. 18—This design is for a low building. The over-head space is reduced to a minimum and the appearance is improved. Another window could go in north of the double doors.

up to each aerator, if 15 inch aerators are used and 12"x24" flue if 18 inch aerators are used. The fresh air intakes will be similar to those shown in the north elevation, fig. 11.



CROSS-SECTION

Fig. 19—Showing the construction of the half-monitor hoghouse and the direct rays of the sun.



SOUTH ELEVATION

Fig. 20—The south elevation of the half-monitor or saw-tooth house" showing "nine light dairy sash" windows for lighting all the way thru. This is a compact little house, warm and well lighted.

Detail of Continuous Skylight Framing

Stub rafters are used from the ridge to raise this portion of the roof above the skylight. A few windows, as many as desired, are fastened with hinges and the space under the top of the windows below the hinge is left open to allow the window to swing up a short distance. The windows that open must be held firmly in place both when open and closed as a protection against the wind. The flat steel spring method as shown in the detail suggest one plan for doing this. Galvanized iron strips can be used to make joints water tight. Note that the location of the sash adjuster in the above detail does not exactly correspond with that shown in fig. 2. The location in this figure provides for the sash to begin 24 inches below the ridge. If the windows are placed 18 inches below the ridge the locations of the adjuster will be about as shown in fig. 2, and the spring shown will fasten onto the girder instead of the rafter.

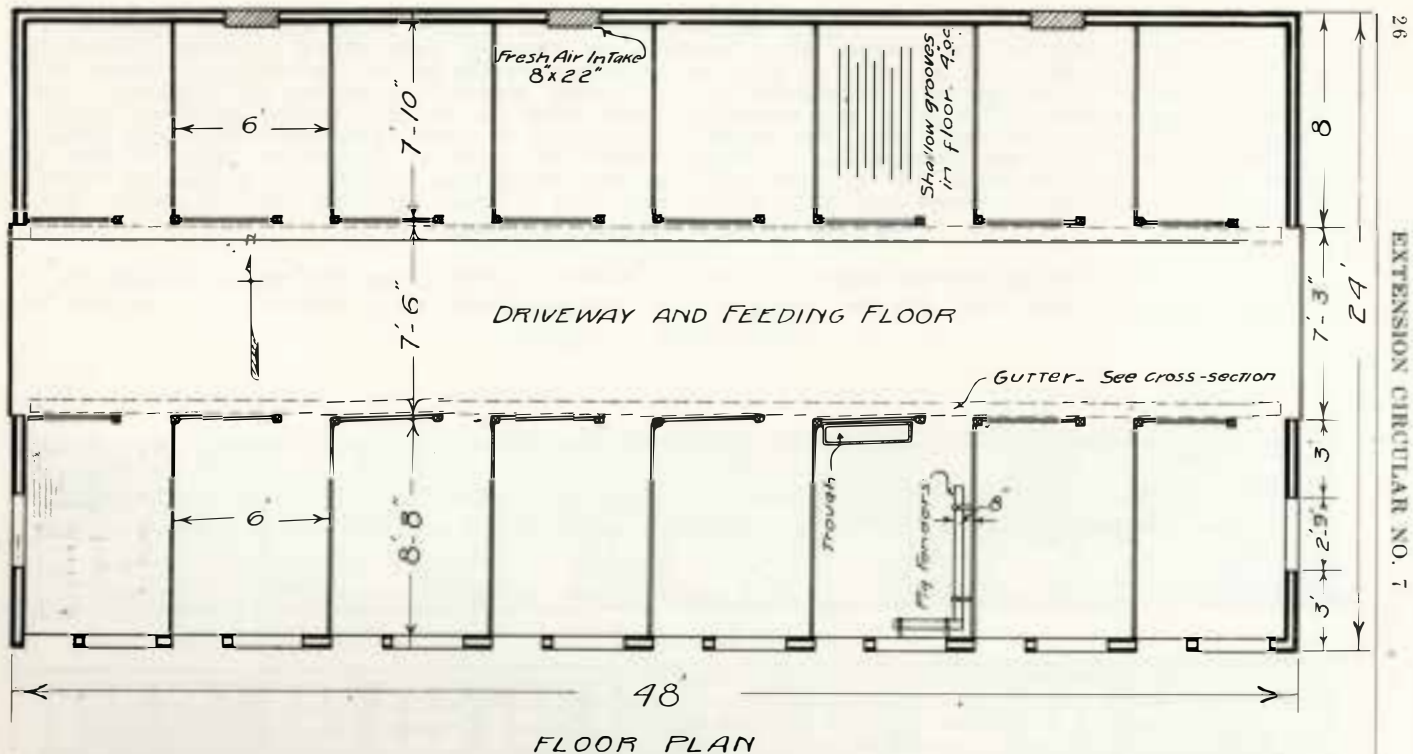


Fig. 21—The floor plan for the preceding house showing 16 pens all 6 feet wide but varying in depth. The south row of pens is nearly a foot deeper than the north row.

HALF MONITOR TYPE**24'x48'****Estimated Bill of Material****Masonry**

- 17 bbls. Portland cement for floor.
- 19 bbls. Portland cement for foundation and footings.
- 27 cu. yds. sand and gravel.

Lumber

- 7 pcs.—4'x4'x12' fir posts.
- 7 pcs.—4'x4'x8 1-2' fir posts.
- 8 pcs.—4'x4'x8' fir posts for short gate posts.
- 28 pcs.—2'x4'x16' Y. P. studding.
- 16 pcs.—2'x4'x14' Y. P. studding.
- 18 pcs.—2'x4'x16' Y. P. plates and sills.
- 25 pcs.—2'x4'x18' Y. P. rafters.
- 25 pcs.—2'x4'x10' Y. P. rafters.
- 8 pcs.—2'x6'x12' Y. P. girders.
- 1450 ft. 1'x8' No. 2 shiplap sheathing for roof.
- 700 ft. 1'x8' No. 1 shiplap sheathing for inside.
- 700 ft. 1'x6' No. 1 W. P. dropsiding.
- 26 pcs.—1'x6'x14' W. P. flooring for doors.
- 40 pcs.—1'x8'x16' rough barn boards for solid partition.
- 16 pcs.—1'x4'x16' W. P. door cleats and casings.
- 14 1-2 squares of extra heavy prepared roofing.

Ventilation

- 2 galvanized iron 18" aerators.
- 4 pcs.—10'x24" screen wire, 1-2"-1-3" mesh for inlets.
- 8 pcs.—1'x12'x10' W. P. barn boards for fresh air flues.
- 8 pcs.—1'x6'x10' W. P. barn boards for fresh air flues.

Note:—If fould air flues are desired run one 12'x24' straight up from alley to aerators, 3' from floor along 12 ft. post.

Windows

- 20—9 pane (9'x12" dairy sash at \$1.35.
- 8—6 pane (8'x10") sash.

Hardware

- 8—6" chain bolt locks for outside pen doors.
- 16—small pulleys for opening doors.
- 8—pr. 8" screw hook and strap hinges (outside doors.)
- 4—sets bird proof door hangers for big doors.
- 32—ft. bird proof track. 80 lbs. 8 d. nails.
- 10 lbs. 20 d. spikes. 25 lbs. 10 d. nails.
- 14—5-8'x10" bolts for footings under posts.
- 16—5-8'x10" bolts for sills.
- 20—cast iron sockets to fasten bottom of short gate posts inside. Screws, staples, small bolts, etc.

See bill for material for pig fenders and for pen front.

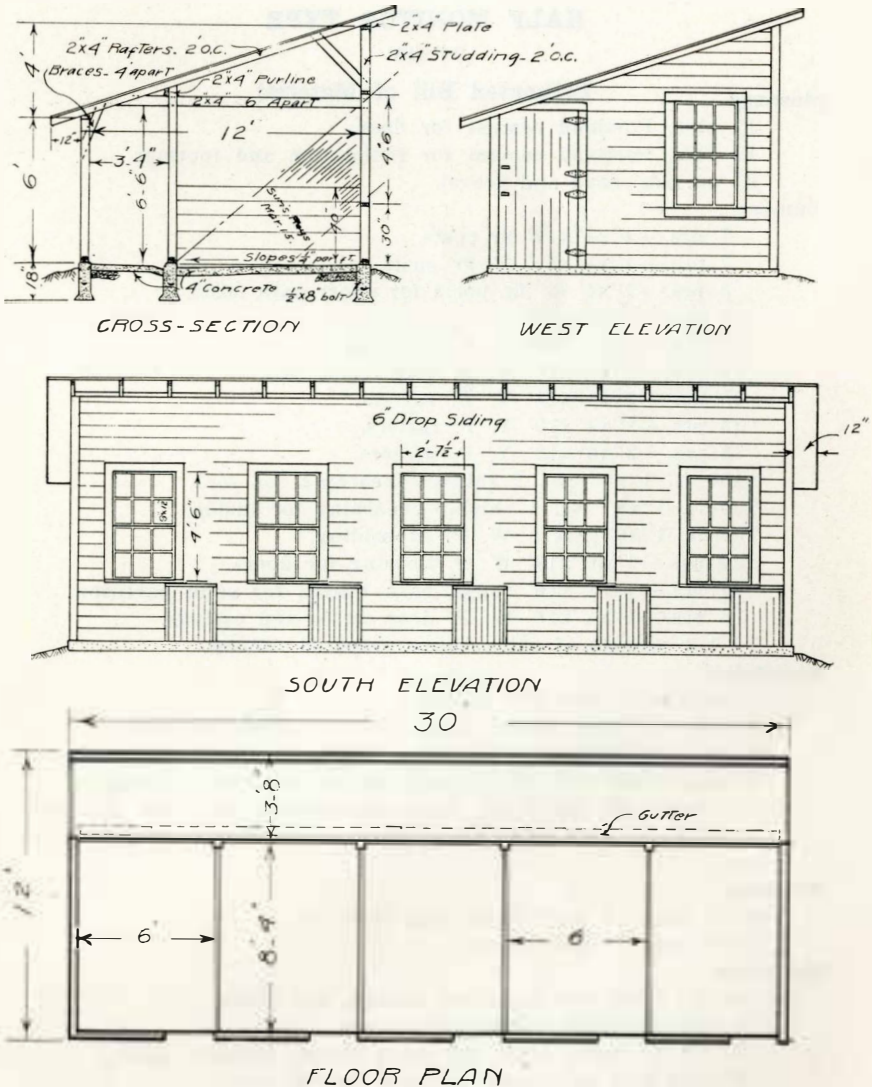


Fig. 22—A complete plan of shed type house, showing framing, end and side view and floor plan. The plan can easily be changed to any length. The single row of pens are well lighted by the 12 pane windows shown.

PLAN E.—THE SHED TYPE

For a very few pens the shed house is recommended. The feed alley is best on the north as the pen fronts cuts off consid-

erable sunlight when the alley is on the south. The plan of construction is simple and strong. The roof is quite flat being a one-sixth pitch and a good grade of guaranteed prepared roofing is therefore recommended for it. The twelve pane windows afford good lighting for the pens.

BILL OF MATERIAL FOR SHED HOUSE

12'x30'

Masonry

- 5 bbls. Portland cement for floor.
- 3 bbls. Portland cement for 6" foundation and footing.
- 7 cu.yds. of sand and gravel.
- 5 loads of road gravel underneath floor.

Lumber

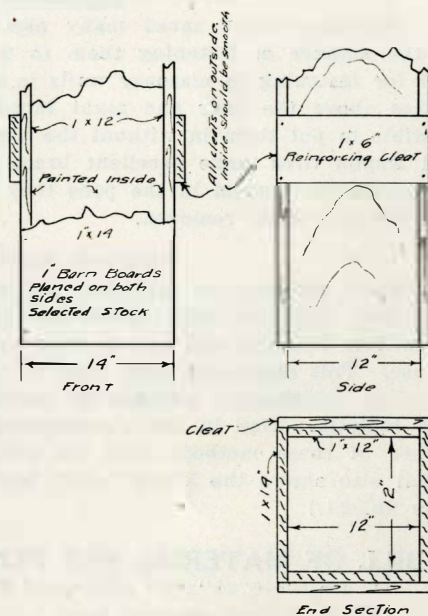
- 36 pcs. 2"x4"x10' Y. P. studding, plates and sills.
- 12 pcs. 2"x4"x12' Y. P. studding and purlines.
- 4 pcs. 2"x4"x16' Y. P. double for posts.
- 10 pcs. 2"x4"x14' Y. P. for cross ties, braces and frames.
- 16 pcs. 2"x4"x16' Y. P. rafters.
- 480 ft. 8" No. 2 shiplap for roof sheathing.
- 480 ft. 6" No. 1 W. P. dropsiding.
- 18 pcs. 1"x4"x14' fir for doors.
- 10 pcs. 1"x4"x16' W. P. cornice and casings.
- 13 pcs. 1"x8"x16' rough for solid partition.
- 4 1-2 squares of best grade prepared roofing.
- See details for pen front.

Hardware

- 5 6" chain bolt locks.
- 9 prs. 6" strap hinges.
- 10 small pulleys to open doors—see fig. 2.
- 7-12 pane (9" x 12") windows.

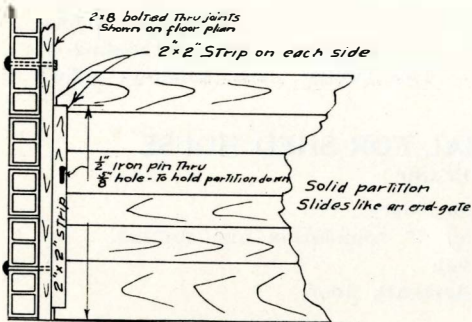
Foul Air Flues

The foul air flues may be built of selected barn boards as shown in fig. 23. They should be perfectly air tight and should be absolutely smooth on the inside without any projections. Painting the inside with heavy filler before putting on the last side will help make the flue tight and preserve the wood. These flues should extend down from two to four feet from the floor. Two feet is better where they can be installed out of the way.



DETAIL OF FOUL AIR VENTILATING FLUE.

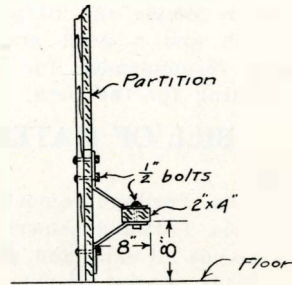
Fig. 23



DETAIL OF PARTITION

Fig. 24

Fig. 24—Showing the end-gate method of fastening partitions and the way the cleats may be fastened to clay block or any masonry wall.



DETAIL OF PIG-FENDER

Fig. 25

Fig. 25—Pig fenders have saved many little pigs at farrowing time.

Pigfenders

Pigfenders have saved many pigs at farrowing time. Details of the manner of fastening them to partitions is shown in fig. 25 and for fastening to masonry walls in fig. 2. They should be eight inches above the floor and eight inches out from the wall. It is possible to put them in without the use of so much steel if desired. Old wagon tires make excellent braces for these. Since they take up considerable room in the pens they should be made so as to be quickly and easily removed.

Fastening Partitions

Many methods of fastening partitions have been tried. The plan that gives the best satisfaction is one in which the partition is entirely removed and put up over head out of the way when not in use. This throws as many pens as desired into one.

Two satisfactory methods of fastening partitions are shown in this bulletin. One in the accompanying detail and one in fig. 9. Either of these methods hold the partition firmly in place. This detail also shows the 2"x10" cleat bolted thru the clay block wall, (see fig. 24.)

BILL OF MATERIAL PER PEN FOR PIG FENDERS

- 8 pcs.—1-2"x2"x12" mild steel bars.
- 16 1-2"x2 1-2" machine bolts.
- 1 pc. 2"x4"x12' for rail.

(Multiply each of these by the number of pens.)

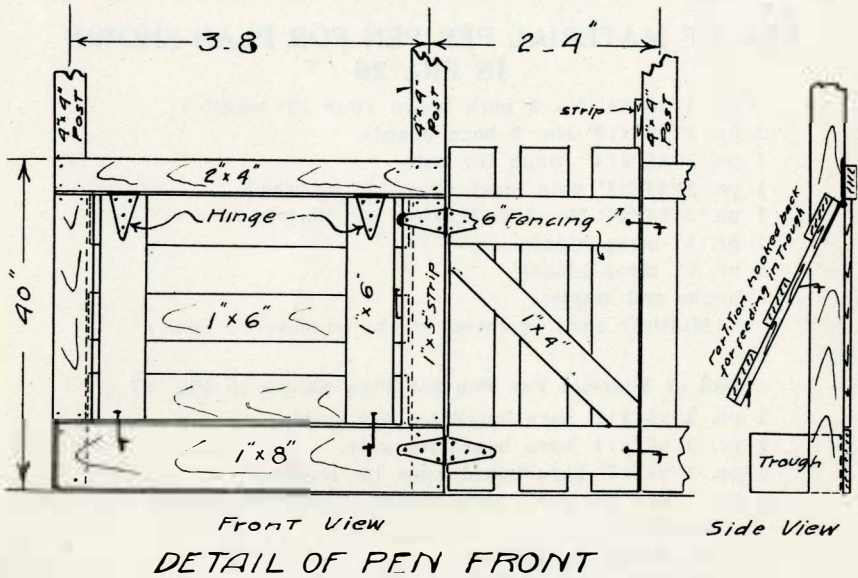


Fig 26—Showing the hinged pen front for convenience in feeding. This method of feeding saves feed as well as character.

Feeding Device in Pen Front

The above arrangement is shown clearly in the drawing. The front of the pen swings in over the trough so the feed can be put in without waste. This method also prevents robbing of the weaker pigs.

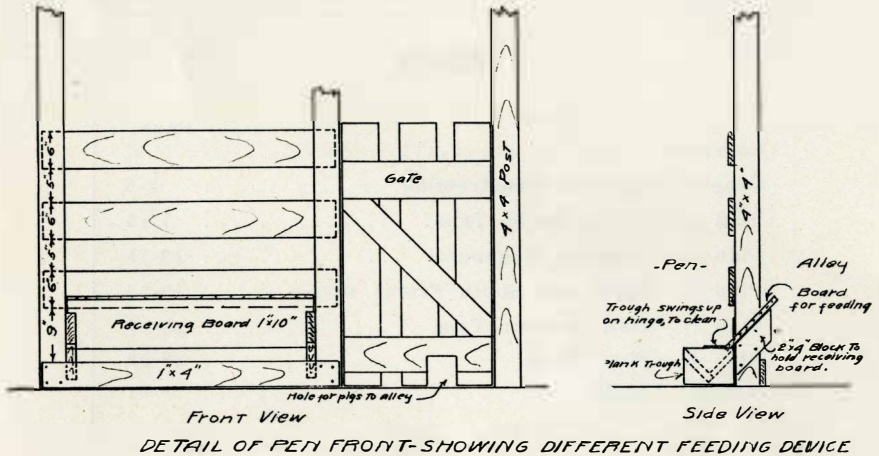


Fig. 27

The figure above shows another device that is stationary and quite satisfactory. Note that the trough is hinged so it can be cleaned when turned up. The hole for pigs to get to alley is a good idea.

BILL OF MATERIAL PER PEN FOR PLAN SHOWN IN FIG. 26

- 1 pc. 1''x8''x4' No. 2 barn board (buy 12' length.)
- 2 pc. 1''x6''x10' No. 2 barn boards.
- 1 pc. 1''x6''x14' rough for gate.
- 1 pc. 1''x4''x3' gate cleat (buy 12' lengths.)
- 1 pc. 2''x4''x4' No. 2 Y. P. (buy 12' lengths.)
- 1 pr. 6'' strap hinges.
- 1 pr. 7'' strap hinges.
- 5 hooks and staples.

(Multiply each of these by the number of pens.)

Bill of Material Per Pen for Plan Shown in Fig. 27

- 1 pc. 1''x6''x12' barn board for pen front.
- 1 pc. 1''x6''x14' barn board for gate.
- 1 pc. 1''x4''x7' barn board (use 14' length.)
- 1 pc. 1''x10''x3 1-3' barn board (receiving board use 10' length.)
- 2 2''x4'' blocks as shown.

(Multiply each of these by the number of pens.)

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