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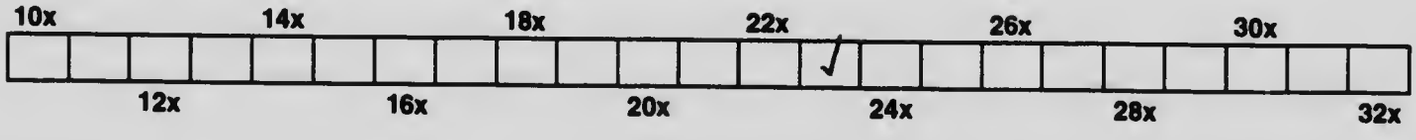

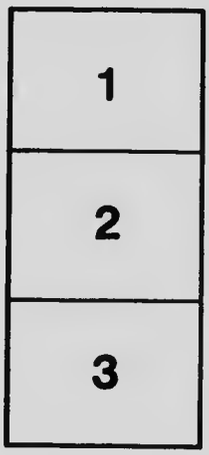

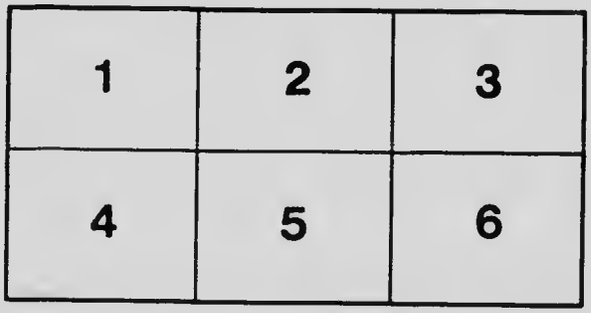

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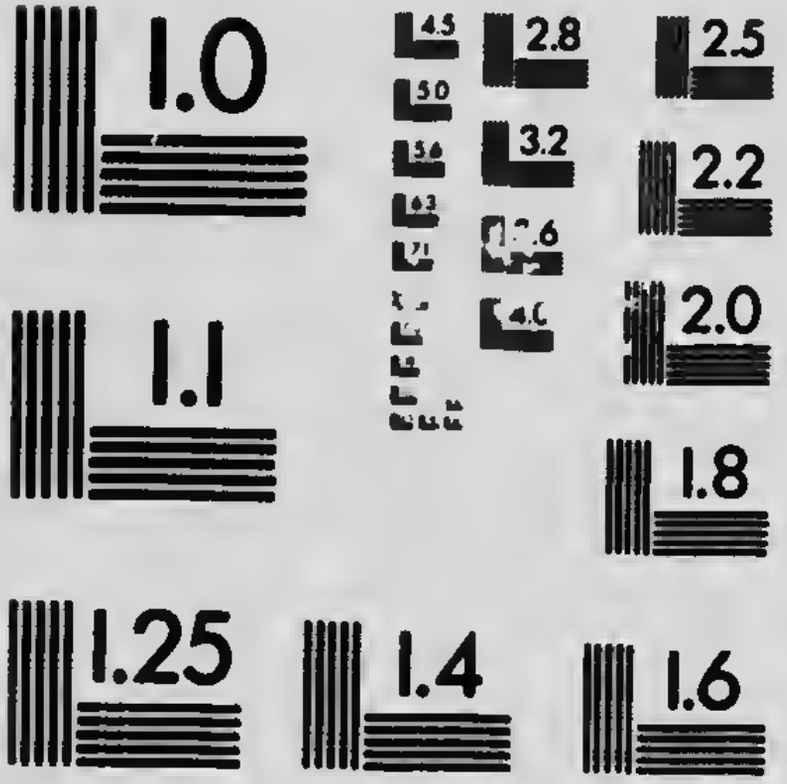

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How to Build a Dairy Barn

K W NEATBY BUILDING
OTTAWA, CANADA.

We wish to offer our thanks to Mr. J. H. Grisdale, Dominion Agriculturist, for the splendid article on "Ventilation" which he has contributed for this book. Possibly no person in America has done more actual experimenting with different systems of ventilation.

We also wish to thank Mr. Craig, of the Alberta Department of Agriculture, and Mr. S. A. Armstrong, of the Ontario Provincial Secretary's Department, for special help in regard to barn and stable plans.

We also wish to thank Mr. W. D. James, of the James Manufacturing Company, Fort Atkinson, Wisconsin, for much help and information which he has supplied us with in compiling this book. The James Manufacturing Company are the leading manufacturers in the United States of Sanitary Stable Fittings, and Mr. James has done more than any other person in the United States to better barn and stable construction and improve cow stalls and stable equipment in that country.

BEATTY BROS.
Fergus, Ont.

The Dairy Barn

"THE COW STABLE is the kitchen where the food for many city babies is prepared, and it is the duty of every farmer and dairyman to see that the kitchen is clean. Cow stables should be light and well ventilated, fitted with concrete floors and steel stalls which are practically indestructible and are necessary for the following reasons:

"Concrete floors do not soak up manure, which is one of the chief causes of the spread of tuberculosis in cattle.

"Steel stanchions and stalls do not obstruct the light, are easily kept clean and do not soak up manure. Stables constructed in this manner are lighter, cleaner and more comfortable for the cattle."

P. B. TUSTIN, Associate Royal Sanitary Institute,
Chief of Food and Dairy Division,
Health Dept., Winnipeg, Man.

BEATTY BROS.
FERGUS, ONT.
AND
BRANDON, MAN.

Fundamentals in Barn Construction

The proper and economical erection of barns requires more foresight and planning than is ordinarily given to their construction. A barn once built is not easily moved or altered in size or shape. There are many points on which men differ with regard to barn construction, and with this in mind it is our purpose to give some general information which may be of help to the prospective builder, and also to give a number of cuts of barn plans which are considered convenient, practical and up-to-date.

Site

The first thing to be thought of in the erection of a barn is the site. Location as to the points of the compass, so that a sheltered barn-yard will be on the south side, the appearance from the highway, the position of the surrounding buildings, the location of trees and hedges for wind-breaks should determine this. Farm barns should be arranged as compactly as possible to facilitate feeding and watering.

Size

The next thing to be thought of is the size to build the barn in order to supply sufficient storage capacity. This calculation should be based upon the present and prospective size of the farm, the number of acres in crops, the kind and number of head of stock and system of farming.

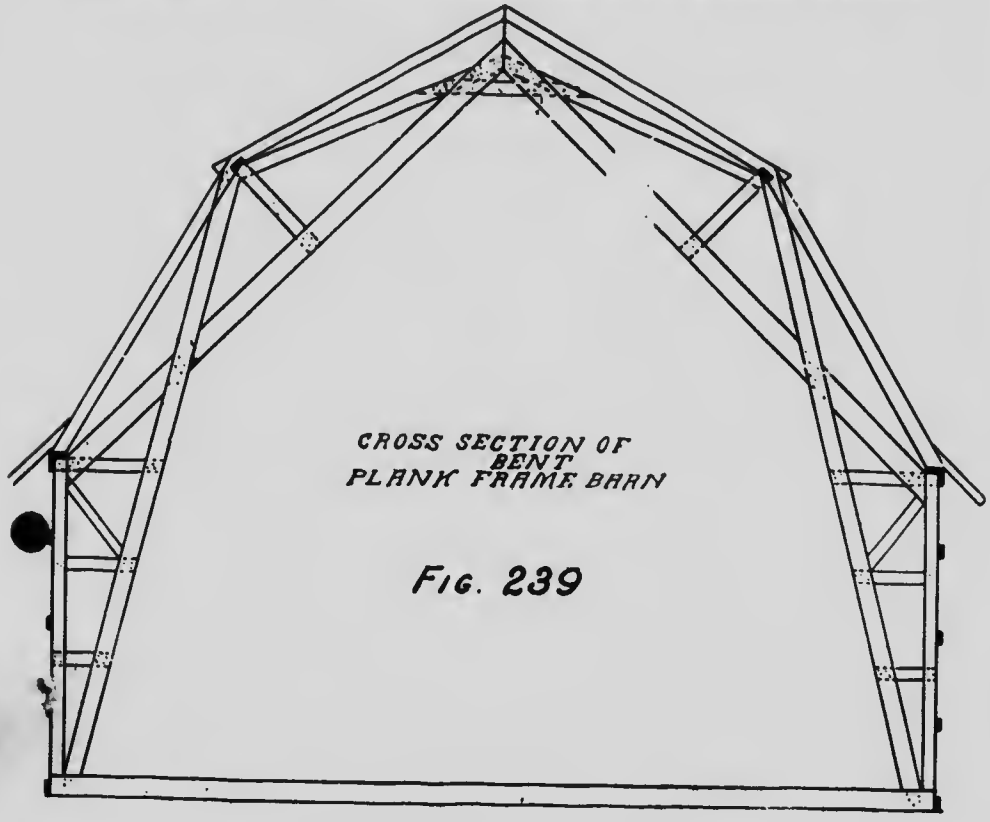
Appearance

After the site and size of the barn are decided upon, the appearance that the proposed barn will make must be taken into consideration. Barns can be made pleasant objects, and their attractiveness will depend upon the design, the exterior finish, the location with relation to the other buildings, etc. A cornice and cupola on a barn add but little to the cost, but do wonders in improving the appearance. Do not sacrifice appearance.

Plank Frame Barns.

If a tight floor is used there is no objection to having a storage loft above the stable. A hip roof on a barn adds to its appearance, gives the loft a greater capacity and also makes it much easier to fill.

With the scarcity of heavy timber and the consequent cost, it is time farmers who are to erect barns should give some study to the newer methods of framing, where no timber is thicker than 2 inches, and from 6 to 10 inches wide. The use of modern hay and grain elevating machinery calls for barns with open cross-sections. Upper cross-beams, collar beams, etc., are in the way and are quite unnecessary. When there are no cross-beams the hay can be run into the mow at just sufficient elevation to clear the hay already there, provided a modern unloading outfit, such as the BT Unloader, is used. This method of unloading saves much time over the old way when every bundle was hoisted to the top of the barn. Besides, when the bundle is hanging in the mow a distance from the track it can be swung to either side of the mow and tripped, and thus save considerable rehandling.



CROSS SECTION OF BENT PLANK FRAME BARN

FIG. 239

The plank frame which is illustrated in Figs. 239 and 241, is the newest thing in barn framing, and at the same time is very much stronger than the old-fashioned frame made of large timbers. It is not nearly as costly, and a first-class carpenter is not required to erect it.

Fig. 240 shows the manner in which the joints are made in order to give rigidity in plank frame construction.

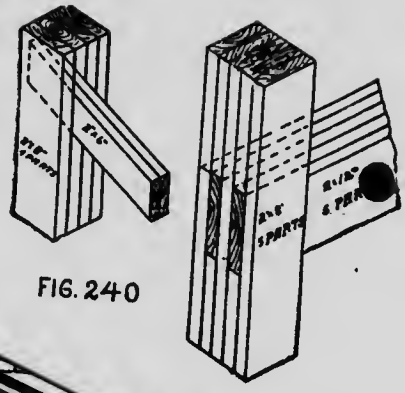


FIG. 240

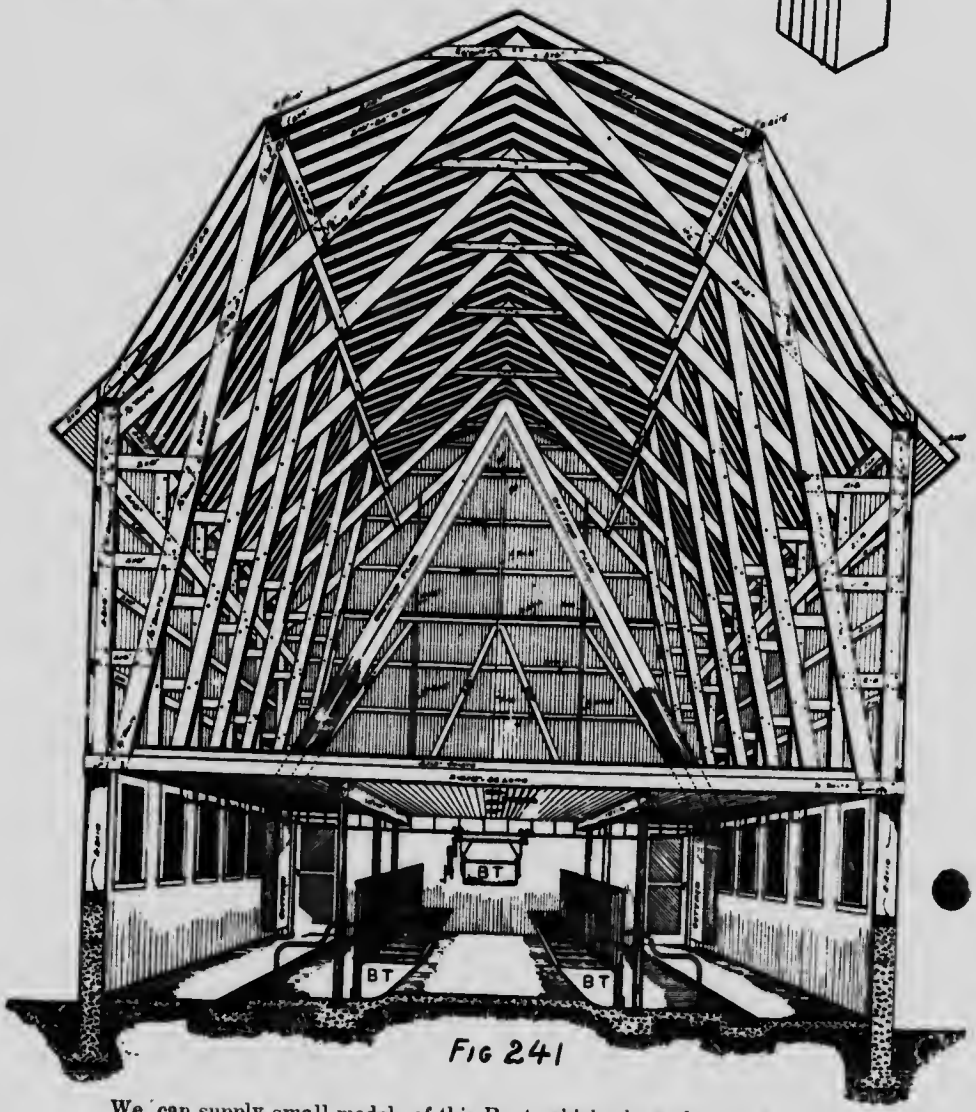


FIG 241

We can supply small models of this Bent which show the end and side panels as well. They are made to a scale and so give the exact construction.

The Cow Stable

A cow barn is really a food factory, and just as much care should be taken in its design and equipment as in any other plant where food products are produced. In order to secure the cleanliness and comfort necessary for the best results the cow barn must be properly arranged, constructed and equipped.

On pages following are given many valuable suggestions relating to barn construction, ventilating, drainage, lighting, arrangement and equipment, which will save money, time and labor, or help to make profits bigger.

In our Northern climate it has been found advisable to keep the dairy herds in the stable from 150 to 200 days each year, in order that they may be most profitable. It has been proven by experience that when animals, especially dairy cows, are exposed to rain or cold winds, there follows an immediate lessening of the milk flow and the amount of fat produced. The stables must be frost and wind proof, but they must also be continually flooded with fresh air and sunshine; otherwise, while the cattle will be protected from the elements, they will be exposed to worse enemies, such as tuberculosis, eye disease, catarrh, bronchitis, foul in the feet, etc., all of which are the result of ill ventilation and filthy stables. The presence of dust, decomposing manure and volumes of deoxidized and even poisonous air from the lungs of the cattle, requires a free and constant supply of fresh air to keep the stable in a healthy condition.

Ventilation is thus absolutely necessary if healthy animals are to be expected, and the question is—how shall the barn be arranged to introduce the necessary fresh air and at the same time expel the foul air which is dangerous to health? The following article on "Ventilation," by J. H. Grisdale, Dominion Agriculturist, covers the ground carefully and fully, and shows the simplest, best and most practical method of ventilating old or new stables.

Effective Ventilation is one of the first requisites of a sanitary stable.

Prof. G. E. DAY.

VENTILATING THE COW BARN

Some Notes and Observations on Stable Ventilation in general, with specific Information as to Ventilation Requirements of a given Dairy Stable, with Illustrated Instructions for Installation of a Suitable System.

By J. H. GRISDALE.

The absolute need for pure air in our stables of all kinds is to-day conceded by practically every stockman. Yet only once in many visits does one find things right. The causes of imperfect success where efforts have been made are various. One of the most common is failure to give proper attention to the system installed. Another often met with is imperfect installation, while ignorance of what good ventilation really is accounts for the most failures of all.

To spend good money and careful thought installing a ventilating system, only to neglect keeping it in operation, is criminal. No effective system ever devised for use in stables is automatic in adjustment to varying atmospheric conditions. Changes in temperature or variation in wind velocity will always necessitate some change in the arrangement of the controls or checks.

Neglect to open or increase the capacity once it has been cut off in some measure in a cold time is the most common cause leading to the condemnation of what might otherwise have been a good system. Another quite frequent cause leading to the condemnation of a system is the too small capacity of the installation. The average carpenter is apt to gauge the requirements of the stable in the way of air by the coldest weather requirements. For this reason installations are very apt to be too limited in capacity for average weather conditions, and much too limited for warm weather.

Then again, an installation may be condemned unfairly because the owner of a stable expects it to do more than any system of ventilation could ever do. A common standard by which the effectiveness of a system is judged is its ability to keep the walls and ceiling free from moisture. This is frequently a most unfair test. Precipitation of moisture on walls or ceiling is due to the warm vapor or water-charged exhalations of the animals, rising and lying for too great a length of time in contact with the cold wall or ceiling as the case may be. If the construction of wall or ceiling be faulty, as for instance, where only double boards with paper between constitute the same, then no system of ventilation could keep them dry without lowering the inside temperature to practically the same as the outside. Walls possible of being kept fairly dry must have more or less insulation, that is, a dead-air space or a concrete core or shavings, or something to prevent too rapid conduction of heat. Then with a fairly rapid circulation of air the walls and ceiling may be kept dry. A ceiling protected by straw or hay overhead is the most satisfactory.

Walls with a dead-air space may usually be kept dry fairly easily. Stone walls or solid cement walls must be wood-lined to insure their being fairly dry. No system of ventilation would otherwise ever keep them dry in very cold weather.

The number of cattle in a given cubic space is quite an important factor making for the effectiveness of any system. Too many cattle makes it difficult to ventilate in such a way as to avoid draughts, too few makes it impossible to keep the temperature up to the comfortable point and at the same time provide for sufficient air circulation. Low temperature does not always mean pure air, and here is a point where a great many stablemen make a mistake. The air in a stable where the thermometer shows several degrees of frost may quite easily be most vile. From all which it seems important, in the first place, to so arrange matters that there shall be about the right number of animals in the given stable, allowing, say, from 600 to 800 cubic feet of air space for each cow two years old and over. This condition existing, there should then be provided about 15 square inches or more of controlled outlet area, and about 8 square inches or more of controlled inlet area for each animal in the stable. For instance, a stable 36ft. x 30 ft. x 10 ft., which might be expected to accommodate 18 or 20 head, should have an outlet about 18 inches square or 20 inches in diameter, if round, and the inlets should be at least 6 inches by 12 inches, and two in number.

By controlled inlets and outlets is meant that it should be possible to cut off the whole or any part of the inlet and outlet by means of some kind of damper or key.

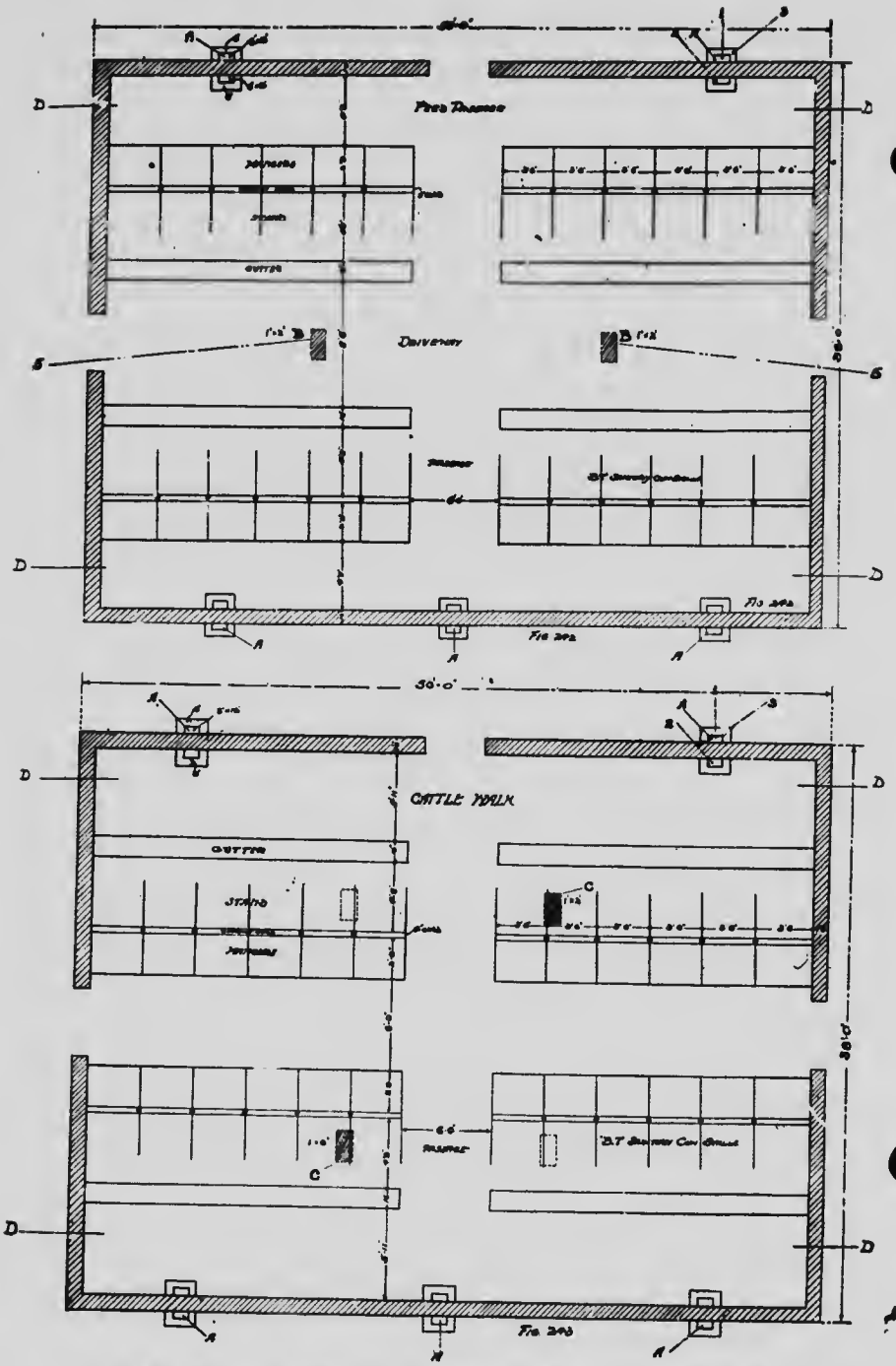
The controls are necessary for the reason that cold air being much heavier than warm air compels a very much more rapid circulation or inflow and outflow of air in extremely cold weather than in warm. This must be controlled or temperatures will fall too low in cold weather and rise too high in warm weather.

The dimensions of shafts or outlets and inlets given above allow for friction of air currents in the shaft, for while 8 to 10 square inches per head in outlet area might be sufficient in very large stables, the same relative area in a small stable would certainly be found faulty. Outlet shafts must be neither too small nor too large. Where materially exceeding the area per head given above, they are likely to work unsatisfactorily and to be constantly dripping in warm weather and freezing in cold, due to the air currents being too sluggish. Where less in area by any considerable amount they are sure to be wet and dripping practically all the time, and to carry impure air off too slowly.

Many systems of ventilation have been devised and advocated. The perfect system has not yet been thought out. It is, besides, practically certain that a system capable of operating satisfactorily under any set of conditions that might be imposed never will be constructed. During the last ten y ars the writer has tested out some thirty or forty different schemes, systems or devices for ventilating farm buildings, such as cow barns, horse barns and piggeries, and has, during that time, learned two things very thoroughly. These two items of information well learned are :—

(1) Good ventilation is a necessary and very profitable feature of any stable.

(2) No known system of ventilation is absolutely automatic or faultless.



It has also been possible to come to some conclusion as to the relative merits and adaptability of the various systems tried out. Many

systems have shown more or less effectiveness, but of the thirty and odd systems experimented with, I may say that the system commonly known as the Rutherford System of Ventilation has proven much superior

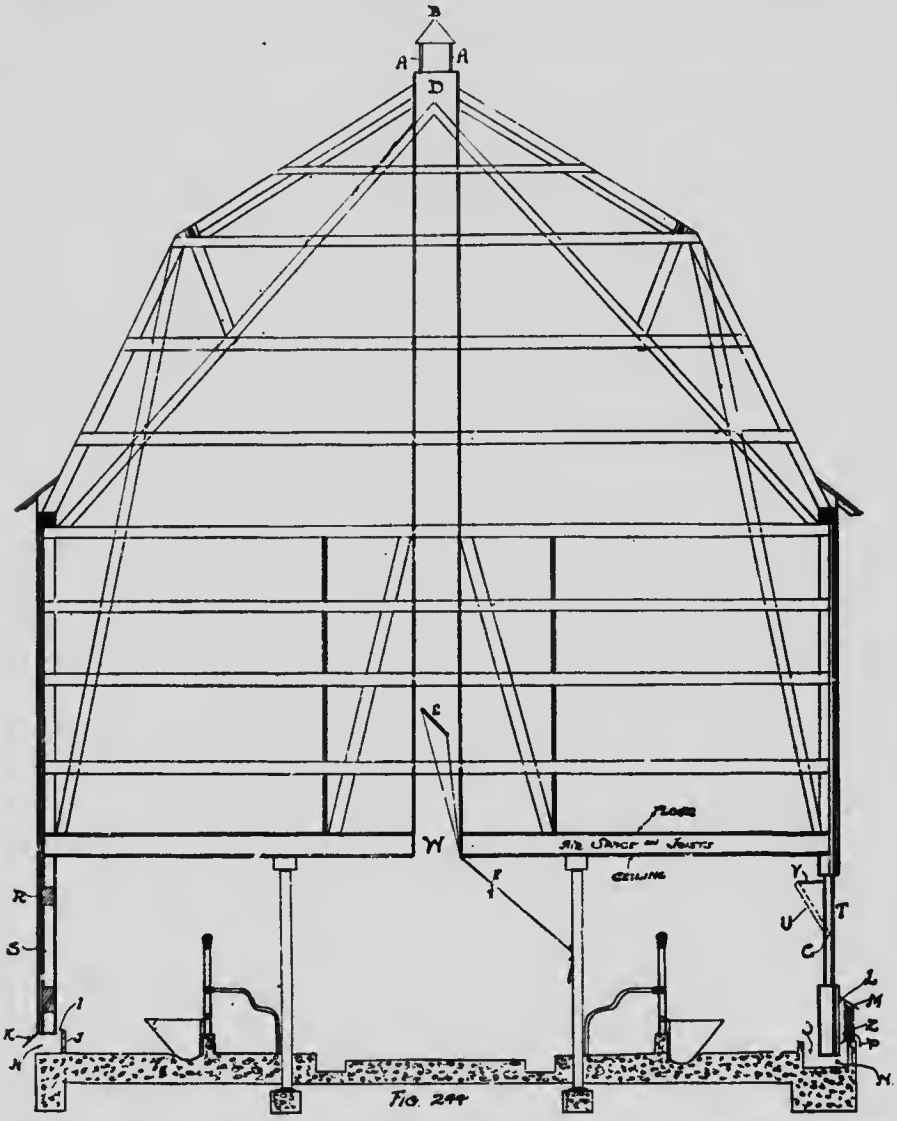


FIG. 244

to any other tried. The superiority of this system is due to various features, the chief being:—

(1) Ease in installation, in buildings old or new.
(2) Adaptability to all classes of stables.
(3) Suitability to variety of weather and climate.
(4) Facility of operation and control.
(5) Effectiveness in control of temperature in all parts of stable.

As just stated, it is susceptible of easy introduction into old stables and may be readily and conveniently installed in new buildings. A study of diagrams given will show probably the best relative positions for inlets and outlets. There is, however, but slight objection to any number of other possible or necessary different arrangements.

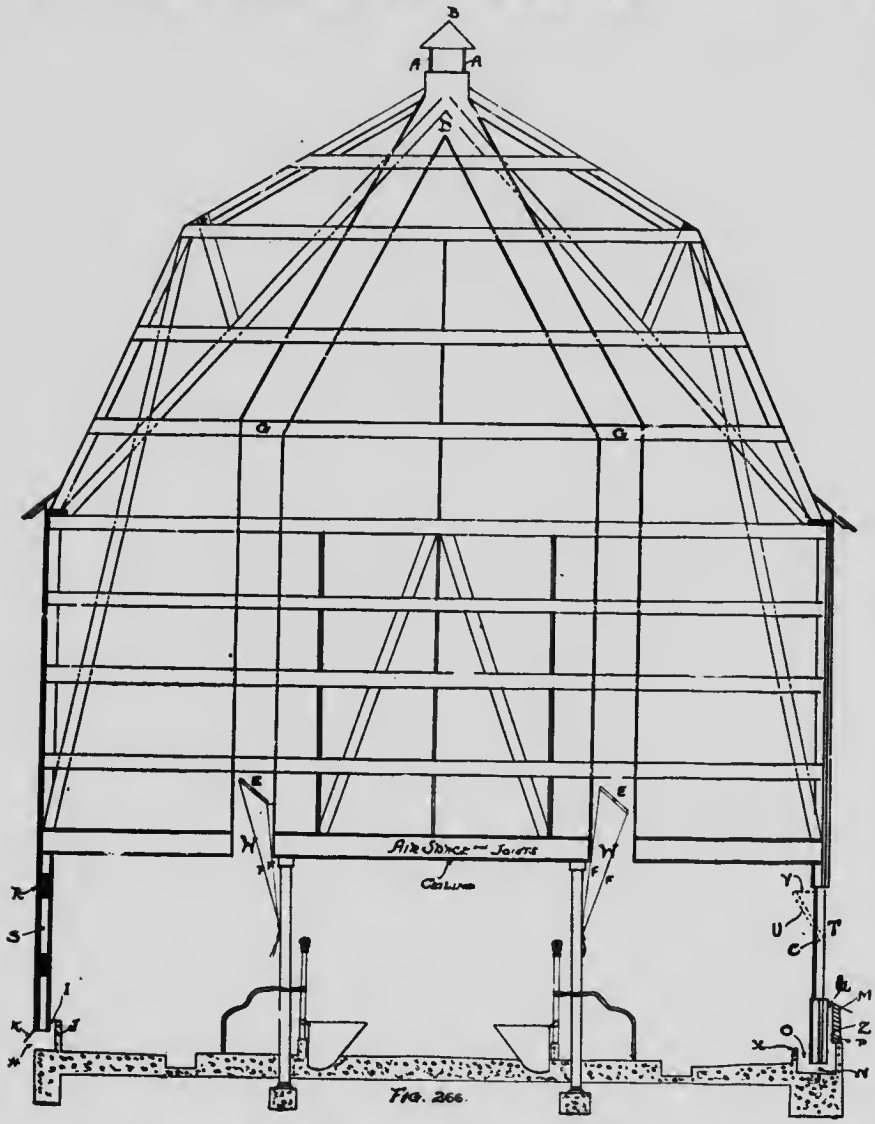


Fig. 242, showing floor plan of a stable for, say, 24 cattle, also illustrates probably the best relative positions of fresh air intakes A A A A A A and foul air outlets B B (beginnings of shaft in ceiling, see W D, Fig. 244). This arrangement suits where nothing in use in the loft or superstructure interferes in any way.

If a hay carrier is to be used in the superstructure, then it might be necessary to change positions of B B to C C, Fig. 243, where shafts would need to be constructed as shown in Fig. 266 by lines W G D. The fact of the outlet shaft changing directions at G and D will not interfere materially with its efficiency. These outlet shafts, provided they are staunchly built as described further on, may take almost any desired course so long as it is always more or less upwards.

The area indicated, 1 ft. x 2 ft. each, or 4 square feet for the two outlet shafts, is somewhat greater than is really necessary, but it is much better to have shafts slightly larger than any smaller than the minimum of 15 square inches per cow mentioned above.

The intakes A A A A A A might, if necessary, be changed to pass under or through walls at D D D D with slightly increased dimensions in each case, say 7 in. x 12 in., to make up for one opening less. This new arrangement would be advisable in case outlet openings had to be placed as C C.

In the intakes, see Fig. 243, fresh air enters at 1, passes under wall and enters stable at 2, with an upward tendency. The wall, 3, should be about 6 in. thick, and on this wall should be built the little guard shown at M in Fig. 244. The inner wall corresponding to 3 need not be over 4 in. thick.

Fig. 244, showing a stable in cross section, will indicate the best method of building walls and ceiling, and also illustrates two different methods of introducing the fresh air in the Rutherford System. There is very little to choose between these two methods: that on the left is somewhat more cheaply installed and can be introduced at any time, while the method on the right is probably somewhat more effective, slightly more expensive, and must be installed when the building is being erected. The following explanatory paragraphs will help to a full understanding of the features illustrated:

The outlet shaft for foul air, W D, should be in duplicate, and should be about 1 ft. x 2 ft. inside measurement. The best construction is boards running vertically, two ply, with inch airspace and two papers between. The opening at the top should be roofed (see Fig. 244). The roof should be supported on four posts, A A, leaving a clear space about 15 or 16 inches between top of shaft and bottom of roof B. The amount of air to escape by these shafts in any given time may be controlled by means of a key as at E. The key may be regulated by cords F F. The key should never be entirely closed. Where the shafts are large enough there is no objection to their being used as chutes for feed or litter, but care should be taken to so hang the door as to insure its remaining tightly closed when not held open to allow of shaft being used as a chute.

The fresh air inlets require careful consideration. The method on the left is very simple of installation. The passage through from H to I should be about 12 in. x 6 in., the greater dimension being horizontal. K is a protection or roof, H the intake, I the outlet into the stable through which the air passes with an upward tendency. J is a guard or band so placed as to direct air currents upwards. To do this it will need to extend about 4 in. above top of opening through wall. It will, of course,

be nailed to the projecting 6 in. sides of this fresh air shaft inside the building, just as K will be nailed to the same sides outside the building. These passages might be controlled by means of small keys or hinged covers, but it is not usually necessary or advisable to so control the intake shafts.

The method on the right hand side (Fig. 244) admits air by the passage N, 12 in. x 6 in. below the level of the floor. Air enters this passage L under shelter of the snow and rain guard M and flows into the stable at O, with an upward tendency. The cement or wooden guard X is to prevent dirt or dust being knocked or swept in. The top or opening should be protected by a grating of some description. It is possible, but seldom necessary or advisable, to provide these inlets with keys or controls. If it is found necessary to use some system of control, then the control P had better be outside the building but inside the guard cabin M where it can be regulated by a cord passing out at Z.

The careful installation of this system of ventilation, with either method of fresh air intake, will insure an abundance of good fresh air at all times, provided it is allowed to operate. If, however, it is left to the mercies of the average hired man, it, like any other system, will be found useless.

To get best results in ventilating any stable and to insure a comfortable, dry building possible of being kept well ventilated, clean and hygienic, attention to the following small details in construction will be found very helpful.

1. Use simple fixings. 2. Ceil under joists. 3. Put in all the windows the superstructure will permit. 4. Let windows be high (see cut). 5. Hinge windows in bottom at C. 6. Use chains as at V to allow them to open inwards at top. 7. Provide double windows for winter. 8. Walls should be built to include air space. Starting from the outside inward, the following construction for stable walls, see Fig. 266, will be found satisfactory:—Battens, R, inch dressed lumber, two tar papers, studding 2 x 6 and air space S, two tar papers, V-joint.

Construction of the Ventilating Flues

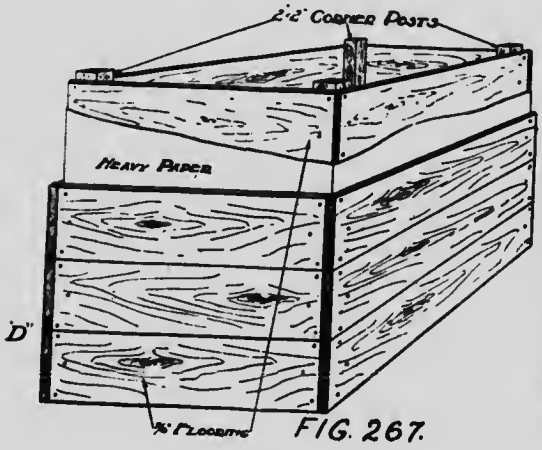


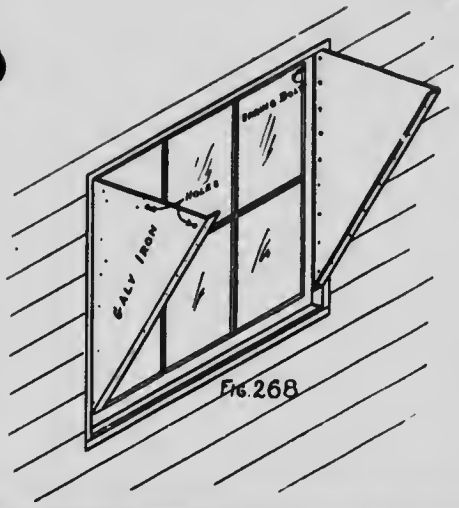
FIG. 267.

A good ventilating flue should have all the characteristics of a good chimney. It should be constructed with airtight walls, so that no air can enter except from the stable. It should rise above the highest portions of the roof, so as to get the full force of the wind.

Stronger currents through the ventilators will be secured by making one or more larger ones than where many small ones are provided, and it is usually best to have as few as possible, and not leave the impure air in distant parts of the stable.

A good form of ventilating flue is made of half-inch matched stuff with building paper or deadening felt between to make it air-tight, for every hole and crack lessens the ventilative power.

Light

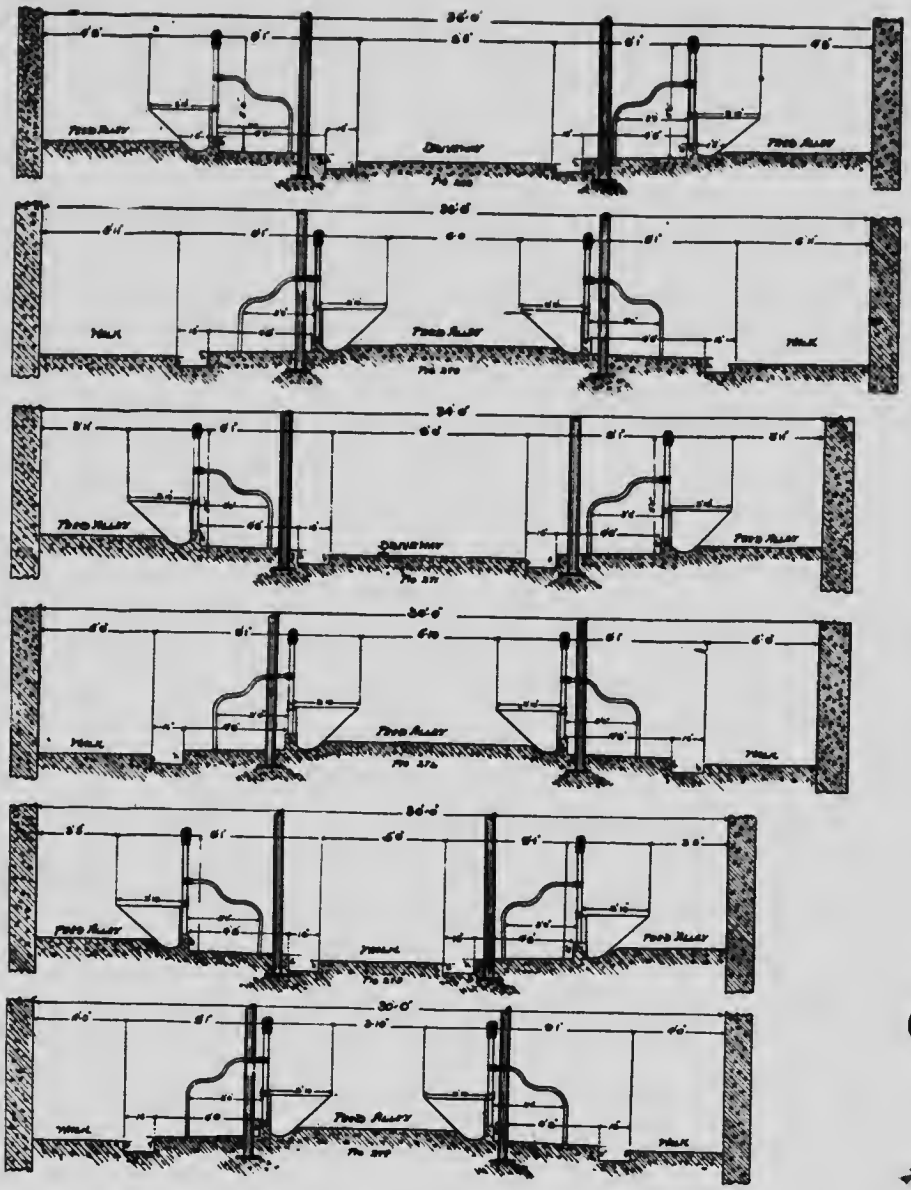


Flood your stable with sunlight for it is the best and cheapest disinfectant in the world. Sunlight will do much to keep the cattle healthy. Put in an abundance of windows, for a dairy stable should not have one dark corner. Four square feet of glass should be provided for each animal to be housed. In our cold climate the windows should consist of single sash, double glazed. They should be hinged at the bottom so that the tops will swing inward, as this will prevent draughts on the cattle by directing the in-rushing air towards the ceiling.

A well-lighted stable. The windows are all hinged to turn down.

The Tubercle Germ grows and thrives in dark places. Sunshine kills the tubercle bacilli.

P. B. TUSTIN,
Chief of the Food and Dairy Division, Winnipeg, Man.



Dimensions

The size of the barn is determined by certain measurements of stalls, mangers, gutters, and passageways that have been found by experience to be the most practical. Following these measurements it has been found that for the best and most practical results a barn should be 36 feet wide, and thus have room for two rows of cows. This is not the most economical dimension when the relation of wall space to floor is considered, but the loss in this direction is more than made up in the ease with which the work of the stable can be performed. Better light and ventilation can be secured by arranging the barn with the cows in only two rows than in any other manner. The cuts on page fourteen show the best arrangement for various widths of barns.

There is considerable difference of opinion as to which is the best way to stand the cows, but we believe on the whole it is better to stand them heads together. The following are some of the main points in favor of this method:

By standing them heads together you get the light on the business end of the cow.

The milkers can see when the cows' udders are clean; the stableman can see better in his work of keeping the stable and cows clean.

It is easier to feed along one central feed-way as both rows can be fed at one time. There is less waste of feed than when two passages are used, and where there is a silo it is much handier to bring the silage in at one place in the centre than at two places on the sides.

There is less confusion in letting the cows in and out.

The supporting posts can be placed in the line of the head rail which is at the narrowest part of the cow, but when the cows stand heads out the supporting post comes in the centre of the cattle stand, taking up considerable room and making it impossible to tie as many cows in the same row.

The ventilating system being at the side of the barn, the odor from the manure will not be so great as when the cows are arranged heads out.

The feed passage being the highest part of the floor and the gutter and walk behind the cows being the lowest, you have a drainage out to the sides of the barn rather than in towards the centre, and it is easier to make it effective.

It is better for the cows not to stand directly facing the windows through which the sun at certain times of the day will be shining very strongly.

The cuts on page four[illegible]ever, show the best measurements for either system with varying [illegible] of barns. They show where the supporting posts should come i[illegible]ner arrangement.

Flooring

Stable floors must be tight, non-absorbent and well drained. They must also be comfortable for the cows, easy to clean and durable. No flooring material can equal cement in these respects, and besides, when well laid, it is almost indestructible. Materials for cement floors are easily obtained, and any intelligent farmer can lay his own. Cement floors will not harbor mice or rats, and will not absorb stable liquids like wood does, and so are sanitary in every respect. If sand and gravel are close at hand, even the first cost will be less than the wood floors.

Materials for Cement Floors

The materials should be of the best grade obtainable to insure a hard, durable floor.

1st. First-class Portland Cement.

2nd. Coarse, clean gravel, free from loam and clay, which prevents the cement from binding the sand and gravel.

3rd. Sharp, coarse, clean sand.

Proportions

For the whole body of the floor thoroughly mix cement, sand and gravel in the proportions of 1, 2½ and 5. Only sufficient water should be added to this mixture to form a stiff paste which will show water when tamped.

Mixing

The cement, sand and gravel are measured in correct ratio on the mixing board and thoroughly mixed before any water is added. The correct amount of water is then sprinkled on this mixture and a second thorough mixing follows.

Laying the Floor

Level off, wet and tamp the earth thoroughly to prevent settling after the floor is finished. Lay rows of cement drain tile with the correct fall to ensure a dry foundation, and arrange for direct cemented connections to the traps which will be in lower ends of mangers and gutters. Then prepare for the laying of the concrete by setting on edge, at the correct distance from one stable wall, straight boards or scantlings 6 inches wide, supported by stakes firmly driven into the ground on the sides of the boards away from the stable wall. With spirit level and grade line see that the top edges of these boards are perfectly level or evenly sloped in the manner in which you wish the finished floor to be. In this space tamp in sufficient gravel to even off all irregularities in the ground surface but leaving sufficient space for a floor of solid concrete 5 inches thick. Tamp the concrete into place, level off with a straight 2 in. x 4 in. scantling, and finish the surface with a wooden float or wire brush, leaving a rough floor surface to prevent the cattle from slipping.

An objection is sometimes made that cement floors are cold for the cows to lie on. If the ground beneath the floor is well underdrained so that there will be no absorption or moisture, there will be little reason for complaint from this cause.

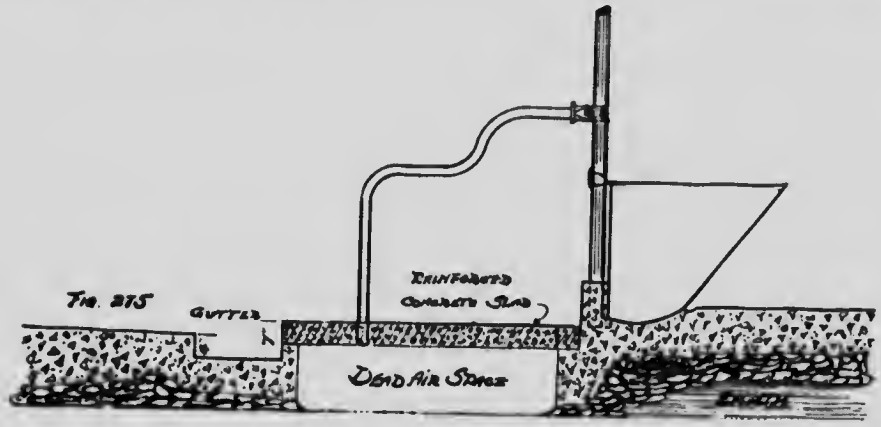


Fig. 275 shows how some stable floors are constructed with a dead-air space below to keep the standing platform dry. A reinforced concrete slab 4 in. thick is used. Such a floor has to be very carefully constructed.

Fig. 276

Fig. 277

An ideal floor is made by a combination of cork brick and cement as shown in cuts, Fig. 276 and Fig. 277. The cork brick consists of finely granulated cork and a special grade of tough asphalt, heated and thoroughly mixed, then made under pressure into brick form. They are easily handled by any workman, being laid either in Portland cement, mortar or in a thin layer of asphalt or pitch.

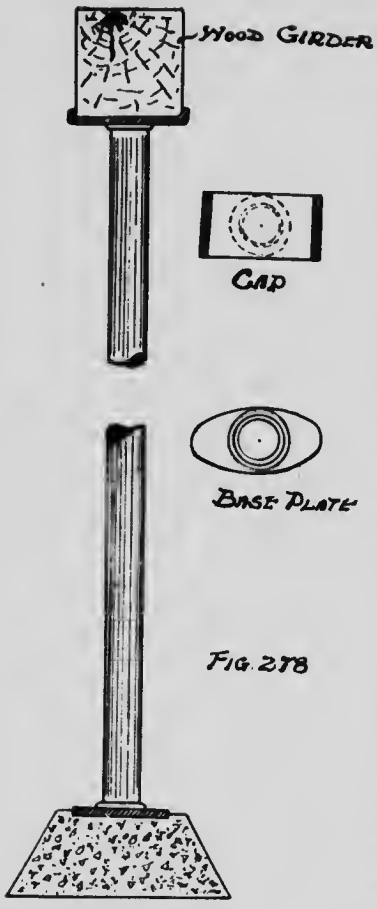


FIG. 278

Iron Columns

Nothing adds more to the appearance of a stable than iron columns. They occupy less space than wood posts, and they interfere less with the light and air. They are much more durable and will not become saturated with manure. In the long run they cost less than wood.

By filling a 3 in. column with concrete it will carry as great a strain as the 4½ in. unfilled column. We will be pleased to give estimates of the different sizes of columns necessary, either made of cast metal or steel tubing, for different sizes of barns and their relative cost.

Walls

The stable should not be over 9 feet high. A ceiling of great height calls for more heat to keep the stable comfortable and is of no special advantage. To insure that the walls will be dry there must be an air space used in their construction. Where cement or stone walls are used, it is preferable to only bring the cement or stone up to the window sills, as is shown on page four, and the cement or stone should be sheeted over, leaving a few inches air space. In his article on "Ventilation," Prof. Grisdale gives information as to the construction of proper walls. See page twelve.

Ceilings

Whenever there is to be a loft or storage barn above the stable, the floor should be perfectly tight so that no dust can sift through to the stable. In addition, close fitting, tongued and grooved lumber should also be nailed to the undersides of the joists to make a plain, smooth ceiling which will harbor little dust and can be easily cleaned. The ceilings and walls as well should either be painted white or whitewashed, as in this way the intensity of light in the stable will be doubled. The ceiling should be eight feet high, and if there are sills overhead the distance from the floor to the undersides of them should be at least 7 feet 6 inches. The undersides of the lintels or fanlights over the doors should be on a level with the undersides of the main beams, so that the overhead track for feed and litter carriers may be kept well out of the way. On page twenty-three this is explained more clearly.

The Stalls

Modern methods and modern barn equipment not only make it possible to keep the cows cleaner and the barn in a more sanitary condition, but make it possible to accomplish this with less labor and at less money cost. The following illustrations and brief description show how various kinds and types of barn equipment effect great saving of time, feed, labor and money. With the most of these classes of equipment the actual money saving in the course of a year is sufficient to pay the entire original cost.

P. B. Tustin, Associate of the Royal Sanitary Institute, who has done so much in the West for the betterment of dairying conditions, in the preface of this book strikes the keynote of the superiority of steel stalls, viz.: "They do not soak up the manure as do wooden ones nor obstruct the light and air in the stable and are easy to keep clean. They reduce to a minimum surfaces for collecting dust and dirt."

The cost of steel stalls is very little greater than of wooden ones. They are practically indestructible. No expensive carpenter is required to set them up, but any one who is laying the cement floor can quickly bolt them together. It enables a farmer to remodel his own stable or to put in a new stable without the necessity of expert help.

Nearly all dairymen now use the swinging steel stanchion for tying their cows. The cow's comfort is of great importance since it has much influence on her milk production. In a good swinging stanchion your cows will have the greatest freedom of movement, consistent with the restraint necessary to keep them lined up in their stalls. They stand in the centre of the stalls and so are free to lie down on either side, to rise up and also card themselves. There is no weight on their necks. There is no possibility of injury to the cows or of their getting loose.

The great advantage of a swinging stanchion tie is that while it gives the cow almost as much freedom as when outside, still it prevents her from moving backwards and forwards in her stall, so that all the manure is confined to the gutter and the cow is kept clean.

Stall Partitions

Fig. 279 illustrates the best in stall construction. A partition should separate every pair of cows. Note the shape of these partitions. The double curve allows the cow to turn out of her stall in a natural manner, and is long enough so that the milker and the next cow are fully protected. Many a valuable cow has been ruined while lying down, by the next cow stepping on her udder, which a proper partition would have saved.

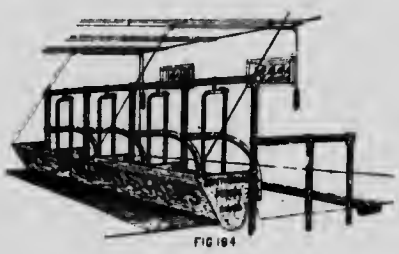


FIG 194

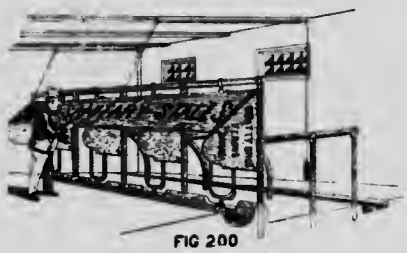


FIG 200

Mangers

The manger can either be constructed entirely of concrete as shown by Fig. 280, page twenty-one, or built with concrete bottoms and galvanized fronts and divisions as shown by Figs. 194 and 200. The latter has the advantage of great capacity, thus preventing waste of feed, and because of the manger divisions each animal will get its proper share.

With mangers of this size and design each cow's feed is held where she can easily reach it to the last morsel. Shallow cement mangers allow the feed to spread out over the feed room floor so that the cows must strain and push to reach it, with the result that they often slip and fall heavily upon their knees, thus causing big knees and suffering.

Mangers similar to those illustrated above are self-cleaning. When the manger is raised as in Fig. 200 the cement trough offers the most convenient and sanitary means of watering the cattle. The manger bottom should be laid with a fall of one inch in forty feet. This system of watering may be used whenever a continuous cement manger is installed. and thus save the cost of water bowls and consequent repair bills.

The swinging stanchions permit of quite as great freedom as could be given by any possible device for tying animals, and at the same time do away with the necessity for partitions between cattle other than simple iron pipes or some similar contrivance.

J. H. GRISDALE, Dominion Agriculturist.

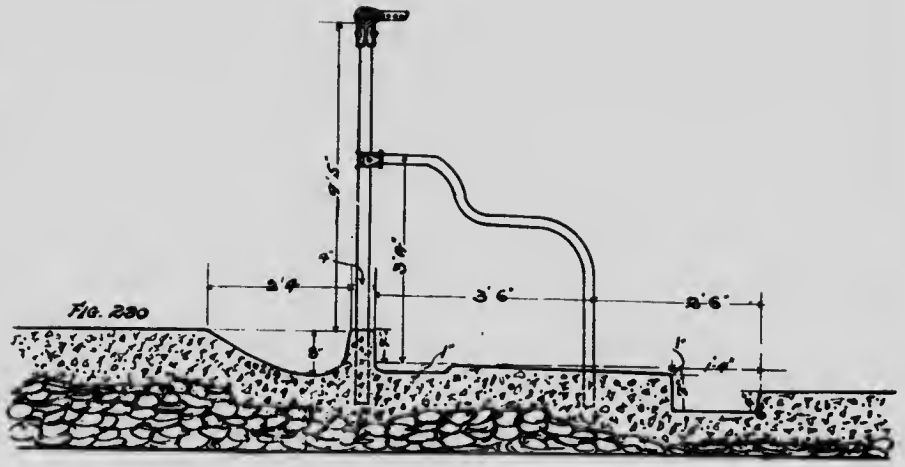


Fig. 280

Fig. 280 shows a cross section of a stall with the best measurements for gutter, cattle stand, manger curb where all-cement manger is used. The walk behind the cattle is better placed 3 or 4 inches below the level of the cattle stand so that the cows will look larger and show off to better advantage in the stalls. A square gutter is, on the whole, better than those of other shapes, as it retains the manure and is not so liable to cause the cows to slip as a gutter with one side sloping.

The cattle stand will vary in length from 4 ft. 6 in. to 5 ft. 6 in. according to the age and breed of the cows. It is a great mistake to have it too long. The above cut shows the aligning device by means of which the lengths of the stalls can be adjusted to suit each cow, and long, short and medium cows can be lined up evenly at the rear so that the litter falls in the gutter.

The cattle stand should have a fall of about 1 in., and it is well to lower the stand a little where the cow's front feet are, as is shown in the above cut. This keeps the cow standing level, and helps to retain the bedding from working into the gutter.

A single post stall is much preferable to any form of double post stall, as it allows the cow to turn her head freely to card herself and to lie down naturally.

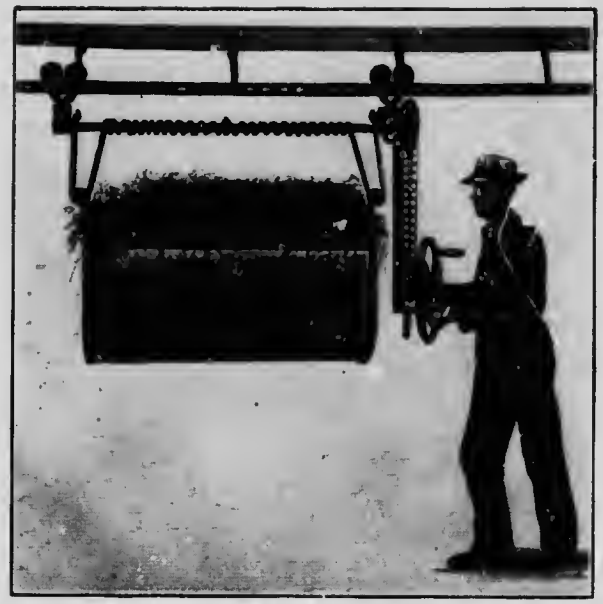
Where it is desired to have some stop to prevent the cow from putting her head in on the wrong side of the stanchion, the post should be made to swing back out of the cow's way after she is tied.

The illustration of the bull-pen shows the most satisfactory method of confining the bull. In such a pen he can be kept with safety and comfort.

Sanitary calf-pens are very important in giving calves the proper care and proper start, and the pens illustrated are the most satisfactory and economical method. The stanchions are adjustable in width for small calves, can be opened separately or all at once, as desired, and, when wanted, can be fitted with the sanitary self-cleaning mangers.

Wooden floors and stalls are more expensive in the end as they are always in need of repair. The tubercle bacilli grow in the cracks and under the floor, and even if the diseased cows are moved, the bacilli thrive in dirty, dark, damp corners, and healthy cows become affected if kept in such surroundings.

P. B. TUSTIN,
Chief of the Food and Dairy Division, Winnipeg, Man.



To remove the manure from the cow stable nothing is handier, quicker or more sanitary than a good litter carrier. One thousand pounds of manure can be taken at one load, and with a level overhead track it is easy to remove the manure a good distance from the barn, or, what is still better, the manure can be dumped directly from the litter carrier into the wagon or sleigh and hauled to the field.

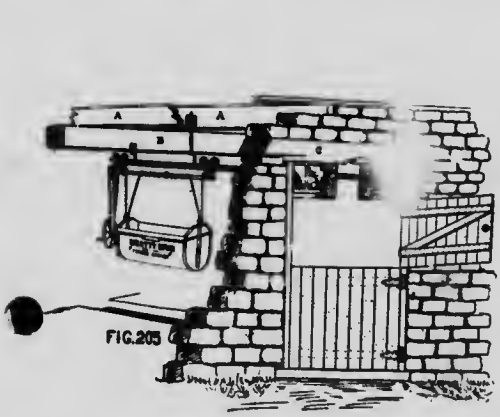
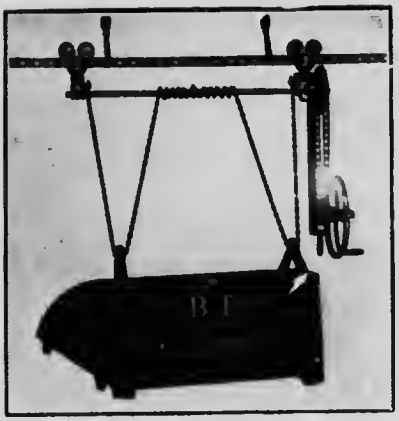


FIG.205

FIG.206

Figs. 205 and 206 show two methods of running the litter carrier through a doorway. The doorway should be kept high so that the under sills of the lintels or fanlights over the door would be on a level with the under sides of the main beams.



The easiest way to handle feed is with an overhead feed carrier. Any quantity of feed up to two tons can be handled by one man in this way, and long rows can be fed with a minimum of walking.

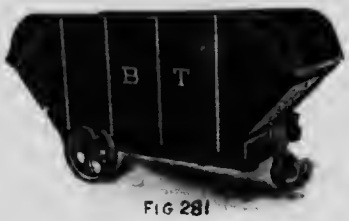


FIG 281

A cheaper method of handling silage or cut feed is by means of a truck. Two men can work unloading if desired, one at either end, and as the truck can be run close to a manger, the feed is carried the least possible distance and handled with the least amount of effort. However, to work a feed truck it is necessary for the floor to be of cement or very smooth, and the floors to be practically on a level and kept clean.

Dairy Utensils, Etc.

Dairymen are generally alive to the necessity of cleanliness with dairy utensils. The milk house should be placed entirely separate from the barn, and all dairy utensils kept there which are not in use. Milk pails with a small opening in the top will reduce contamination at least 25 per cent. A separate dairy building and care in handling the milk will help wonderfully in producing good results.

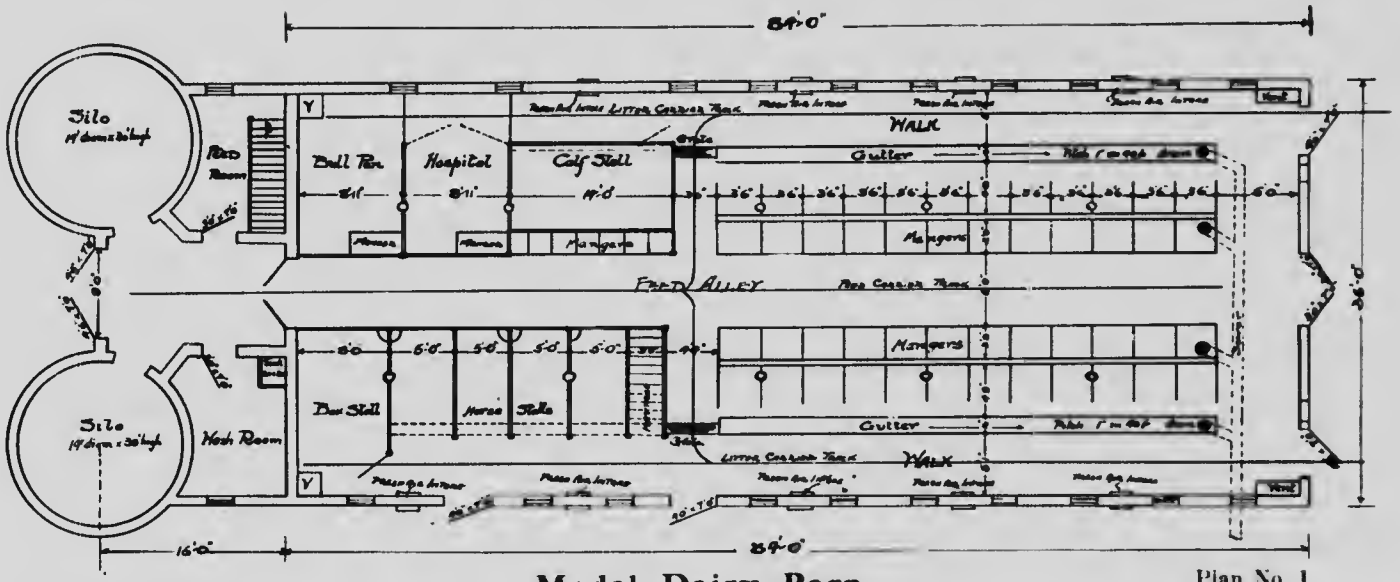
Model Dairy Barns

On the following pages we give a few plans of dairy barns that embody the points brought out in the foregoing pages. These plans are of barns that were designed by us for customers, and of which we can furnish complete blue prints, specifications and lumber bills if desired. The blue prints show floor plans, end and side elevations and cross sections and give all necessary dimensions and measurements. These plans are only a few of the many which we have on file, available for your guidance.

On account of the large demand for blue prints, specifications and lumber bills, we find it necessary to make a charge for them to cover cost of materials, preparation and mailing.

A complete set of blue prints, including end and side elevations, floor plans and cross sections of any barn shown herein will be furnished postpaid, for $1.00; specifications, any barn, $1.00; lumber bill, any barn, $1.00; or blue prints, specifications and lumber bill of any barn, $2.50.

If none of the plans shown here meet with your particular requirements, write us fully regarding the barn you have in mind; if we have no blue print on hand of a barn that will suit, we will be glad to plan one especially to meet your needs. There will be no charge for this service, unless blue prints, specifications and lumber bills are especially ordered, in which case the charge will be only sufficient to cover the cost.



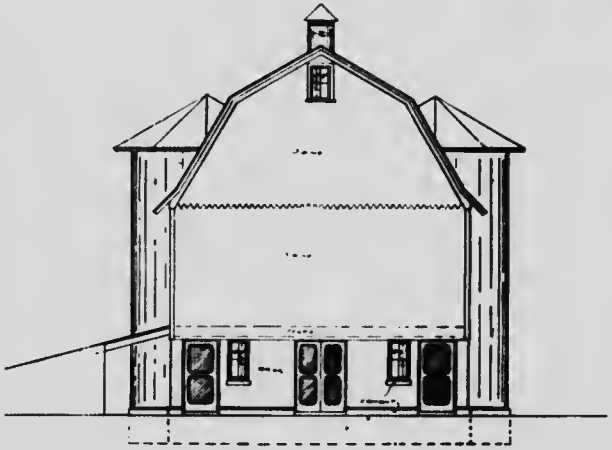
Model Dairy Barn

Plan No. 1

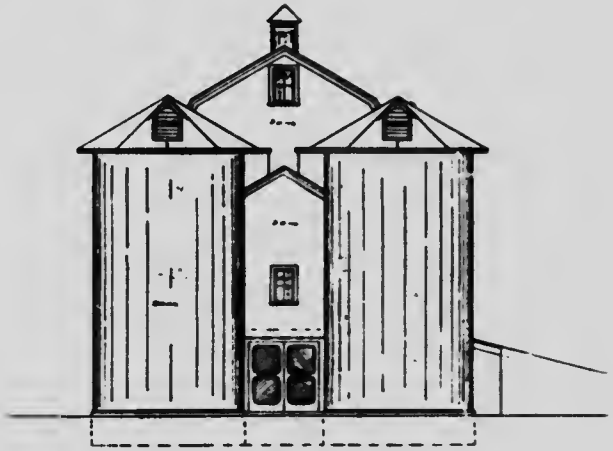
The State of Wisconsin is without a doubt the most advanced dairy State in the United States. From it nearly all the best dairy stock originates and their best dairy products. Some idea of the development they have made in dairying is shown by the fact that their average milk production per cow is nearly 8000 lbs. per annum, while in Ontario the average milk production is only slightly over 3000 lbs. per cow per annum.

The State of Wisconsin naturally takes a very keen interest in everything pertaining to dairying, and two years ago it offered a prize of $1000.00 for the best plan of a model dairy barn for an ordinary farm—cost not to exceed $2000.00. The plan as shown above was given the prize, and they erected it on their State fair grounds as a permanent model for their farmers. The barn was designed by W. D. James, of the James Manufacturing Co., of Fort Atkinson, Wisconsin.

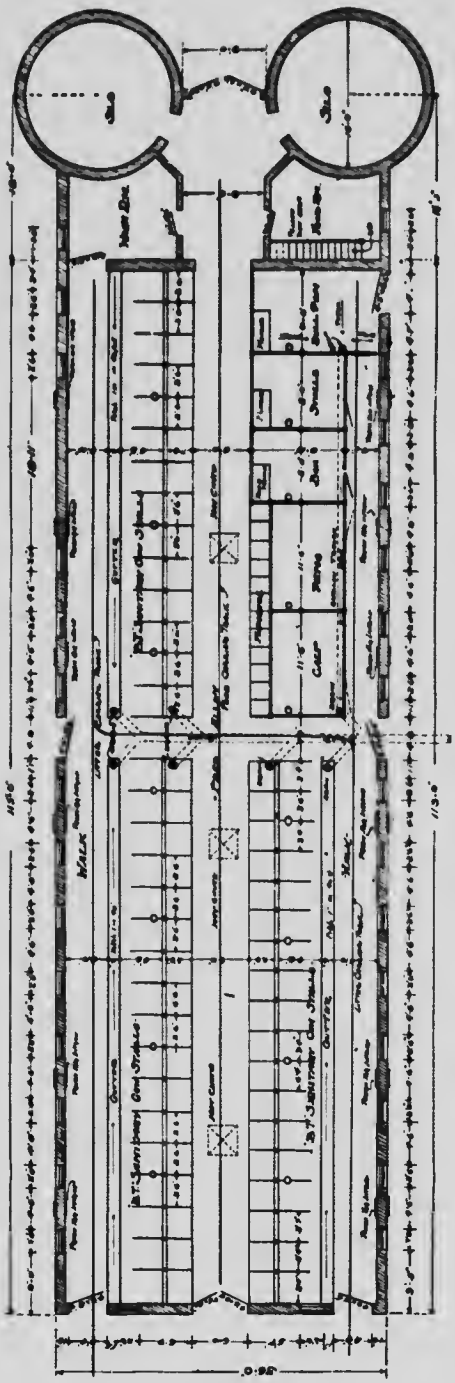
This plan contains many excellent features. Side and end elevations are shown on the next page. This plan lends itself to be varied easily for more or less cow or horse accommodation. As stated on the previous pages, we can supply complete blue prints and specifications for this barn or any of those shown on the following pages.



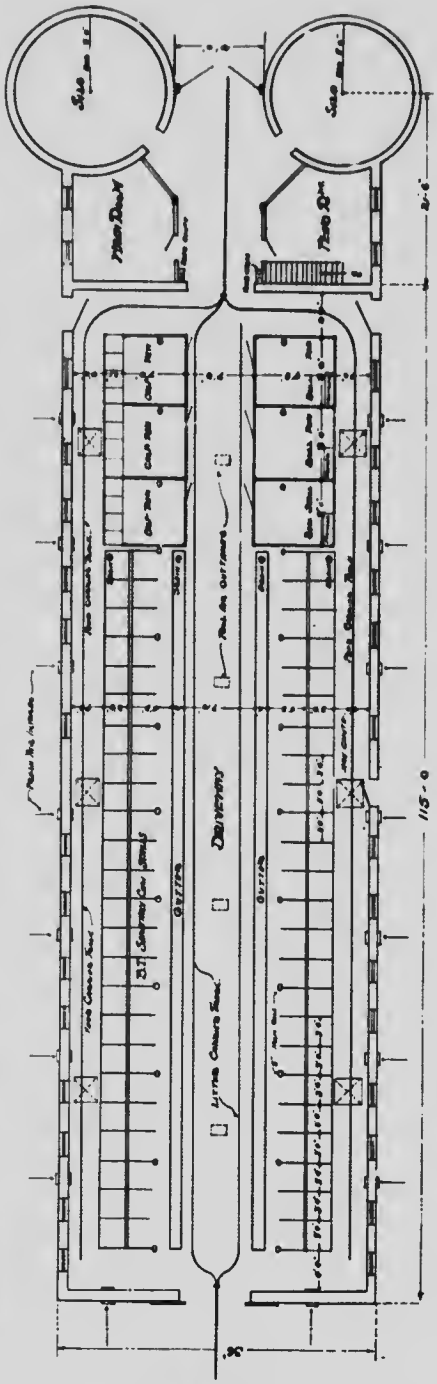
FRONT ELEVATION.



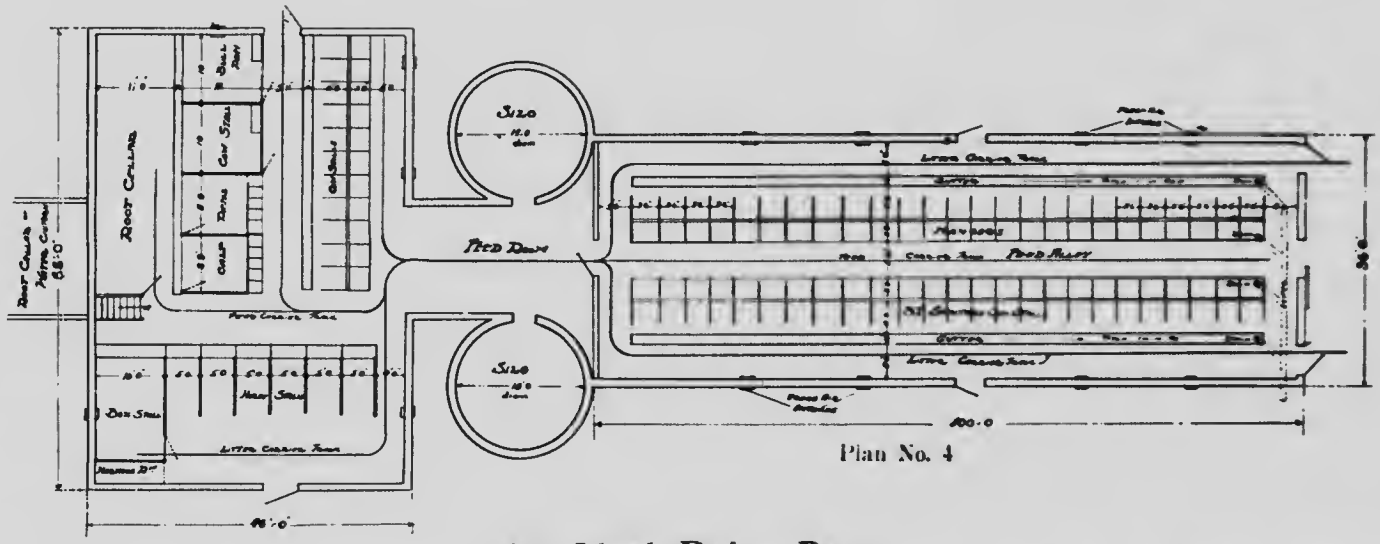
DEAD ELEVATION.



Plan No. 2



Plan No. 3



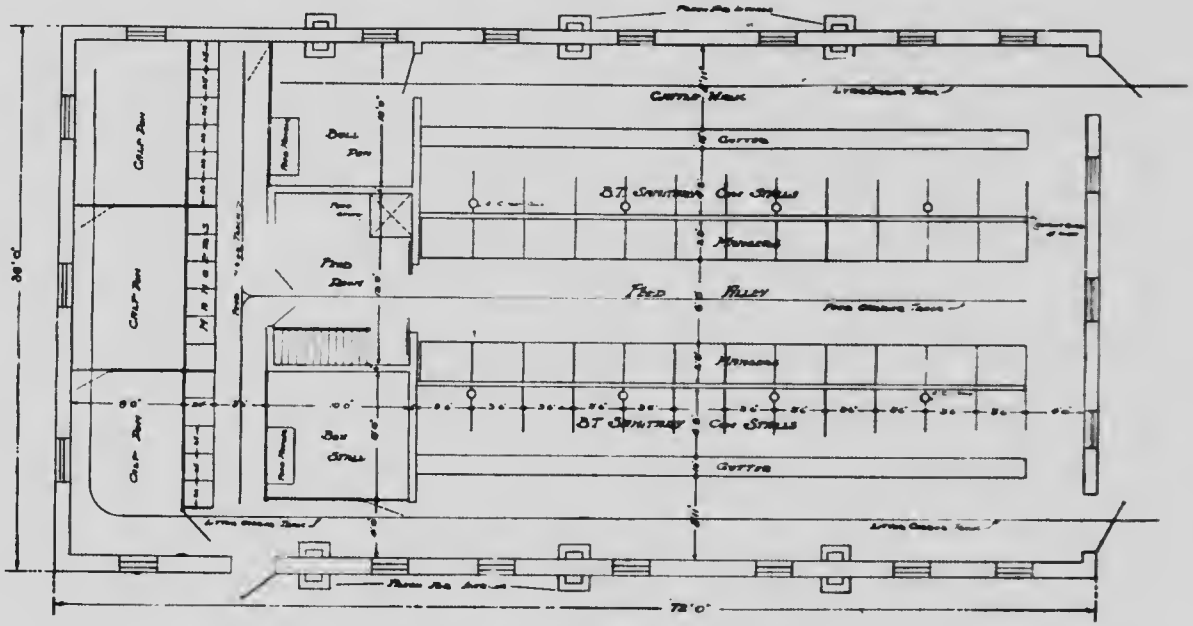
Plan No. 4

An Ideal Dairy Barn

Plan No. 4 shows an ideal layout for a dairy barn. The young stock, dry cows and horses are entirely separated from the milking cows. The cow barn is only one-storey, all hay, straw and grain being kept in the big stock barn. The cow barn is separated from the feed room by a solid wall. For ventilation, sanitation and convenience the above layout, we think, cannot be beaten.

This barn was designed by Mr. S. A. Armstrong, of the Ontario Provincial Secretary's Department, was erected on the Prison Farm at Guelph this year, and is equipped with BT Stalls and Stanchions.

The Plans on page 28 show two standard dairy barns—Plan 2 with heads in, which is preferable, and Plan 3 with heads out. They also show different layouts for the box stall and hospital department.



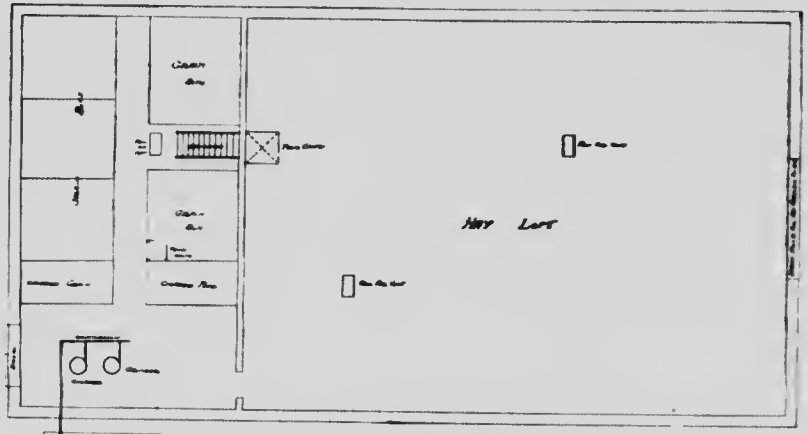
A Western Dairy Barn

Plan No. 5

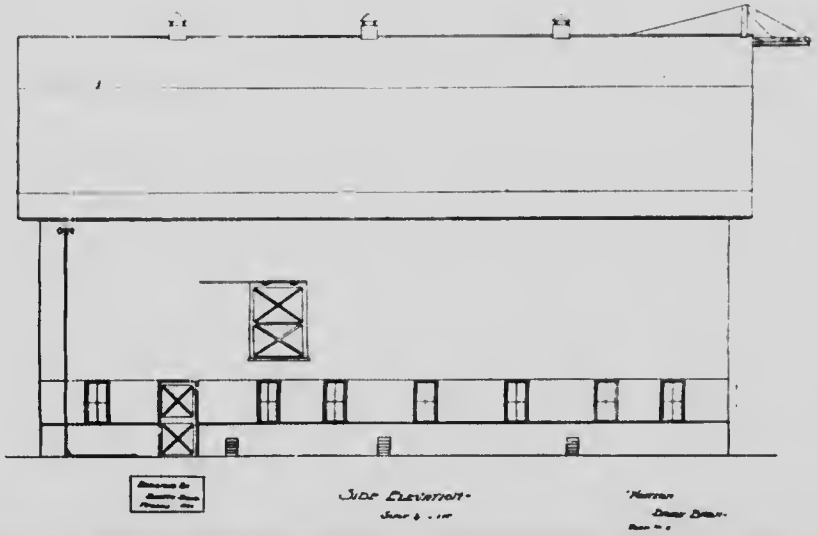
The Province of Alberta has just put up seven model dairy barns on its experimental farms in different parts of the Province. The barns, we believe, are ideal dairy barns for the Western Farm. They were designed by the Hon. Duncan Marshall, Minister of Agriculture, and Mr. H. A. Craig, B.S.A., Superintendent of Model Farms.

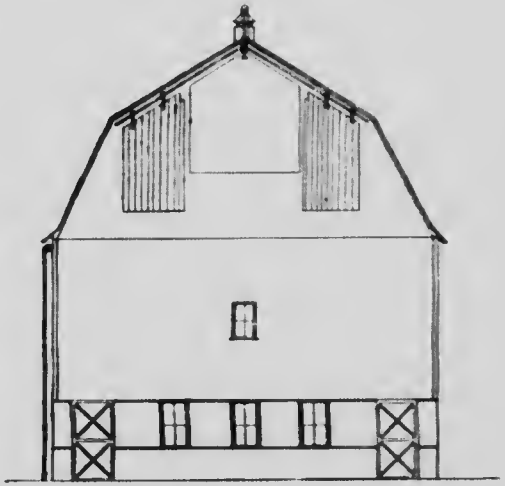
The plan lends itself readily to expansion. Note the convenience of the central feed room and its relation to the second floor plan shown on the next page. Side and end elevations of this barn are also given on page 31.

These barns were all equipped with BT Stalls and Carriers.



Second Floor Plan of
Western Dairy Barn





End Elevation Western Dairy Barn

Plan No. 6 shows an Ell-shaped barn which has accommodation for a large number of stock. The Ell is used for hospital, calves, bulls, etc., and above it is used for straw storage.

This makes a splendid stock barn and lends itself to variations to suit different conditions.

We have a great number of other plans on file in our office. Write us giving a rough lay-out of what you would require, and we will be pleased to send you blue prints showing complete plan.

Plan No. 6

Price List Covering BT Barn Plan Service

We supply absolutely free, any counsel or advice as to the best layout or plans for any barn. We also supply free, with each inquiry we receive for stable equipment, a pencil sketch showing the best floor plan.

When we supply complete plans, we charge on the following basis:

	PLANS COST	LUMBER BILL & SPECIFICATIONS
Barns for 1 to 20 stalls	$ 5 00	$ 2 00
" 21 to 40 "	7 50	3 00
" 41 to 80 "	10 00	4 00
" 81 to 100 "	15 00	5 00
" 101 or over "	25 00	10 00

TERMS: Cash in advance

The above plans include complete blueprints covering all side and end elevations, floor plans, cross sections with all measurements and showing sizes of all timber or plank to be used. They illustrate position and size of all windows, doors and ventilation inlets and outlets. Also position of hay and litter carrier tracks.

The lumber bill and specifications give complete information as to the quantities and sizes of all material required and also specifications covering the finish and work.

Please note that the above number of stalls includes cow stalls cow, bull or calf box stalls, horse stalls and horse box stalls, i. e., a point will be counted for every stall on the plan.

Also note that in event of a customer purchasing from us a complete set of plans and afterwards favouring us with an order for the equipment we will allow him one-half the price paid for the plans off the price he is to pay us for the goods.

We have a large number of stock plans on hand. In our book – "How To Build A Dairy Barn", the floor plans of a number of these are shown. Having these plans already made up, we are in a position to supply any customer with a complete set showing layout, cross sections and elevations for the sum of $1.00 (one dollar) and if he so desires, we can supply him with a complete set of specifications and lumber bill for the same price of $1 (one dollar) i. e., a complete set of stock plans, including specifications and lumber bill would cost $2.00 (two dollars).

BEATTY BROS. LIMITED FERGUS, ONT. AND WINNIPEG MAN.

THE BT LINE

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FERGUS, ONT.
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HAY CARRIERS
HORSE-FORKS AND SLINGS
WATER-BOWLS
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BT STANDS FOR B&T