

University of Missouri.

COLLEGE OF AGRICULTURE AND MECHANIC ARTS.

AGRICULTURAL EXPERIMENT STATION.

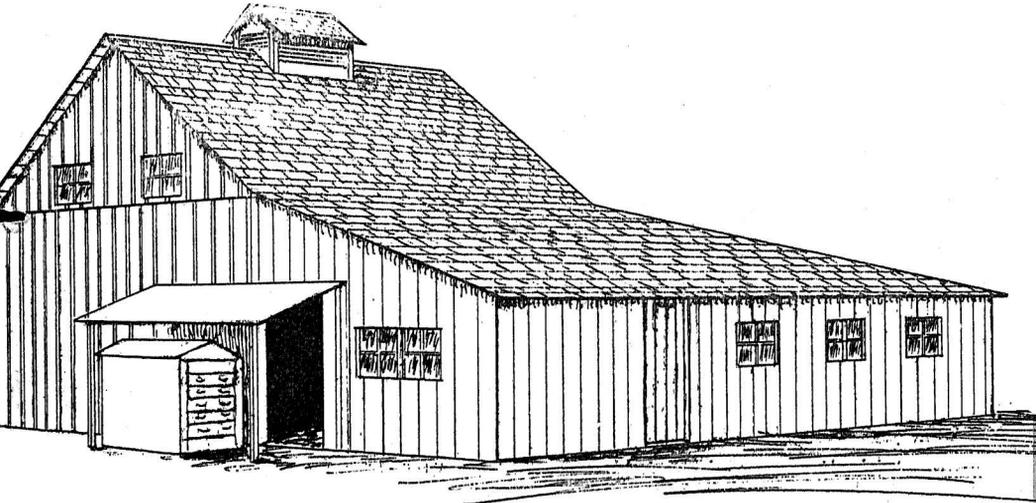


FIGURE I. FRONT ELEVATION, SHOWING PARING SHED, BLEACHER AND ENTRANCE TO DRYING ROOM.

COMMERCIAL FRUIT EVAPORATORS.

COLUMBIA, MISSOURI.

A Cheap Commercial Fruit Evaporator.

INTRODUCTION.

The development of apple growing in Missouri is assuming great importance. From advance sheets of the last census report (1900), it appears that this state leads in the number of growing apple trees. Anything which tends to aid in securing the best returns from the extensive apple crop is of direct value to the fruit grower. In years when the apple crop is abundant, particularly if prices are low, the question of how best to utilize the fruit is one of great importance. In any season, a portion of the apple crop is necessarily of such grade as to render it less suitable for packing than for evaporating purposes.

Economical methods of evaporating the apples of lower grade are being more fully considered by fruit growers. It has been fully demonstrated by a number of apple growers that this work may be done in an inexpensive building and with apparatus which is within the reach of most orchardists. Expensive buildings and apparatus formerly employed for the purpose, are no longer necessary. There is now no good reason why hundreds of growers should not begin evaporating their fruit of low grade, much of which has largely gone to waste in the past. In many cases the evaporated peelings and cores have yielded enough to pay for evaporating the entire crop of fruit which is not suited for packing. Some of the advantages of a home evaporating establishment are:

First: It enables the grower to utilize to the best advantage all apples of low grade, which are not suited to packing, and which would otherwise go to waste.

Second: In years of abundant crop and low prices for green fruit, all but the best fruit may be evaporated. This insures a better price for the barreled fruit put upon the market and carries over a portion of the fruit in a form to be utilized in years of scarcity.

Third: If bitter rot occurs the diseased fruit may be evaporated before it spoils, thus not only saving the in-

fectured fruit, but largely preventing the spread of the bitter rot to the sound fruit by removing a source of infection.

It is the purpose of the following paper to furnish information for the practical apple growers who wish to put up economical buildings for evaporating. Mr. Goodman has had wide experience in apple growing and in evaporating. It has been his aim to furnish just such practical information as will enable the practical orchardist to put up an economical building which will meet his needs for this purpose and add to his revenue, especially in years when the entire apple crop cannot be profitably marketed in barrels. Fruit growers who have tried this plan of evaporating a part of the crop have found that it adds to their profits. In those communities where evaporators are in general use, the fruit growers have proved to be the most prosperous. There is no doubt that evaporators should be more generally used and it is hoped that this paper may prove helpful to those who contemplate erecting them.

J. C. WHITTEN,
Horticulturist.

THE EVAPORATOR.



By L. A. GOODMAN, A. B.,
Secretary of the Missouri State Horticultural Society.

The economical evaporator of to-day is so entirely distinct from those in use years ago, that the old forms are scarcely recognizable. The old evaporator consisted of an expensive building, a large amount of machinery—costly at its best—hundreds of trays to hold the fruit, an expensive furnace, much equipment in way of chains, pulleys, cranks, slides, steps, doors and rooms.

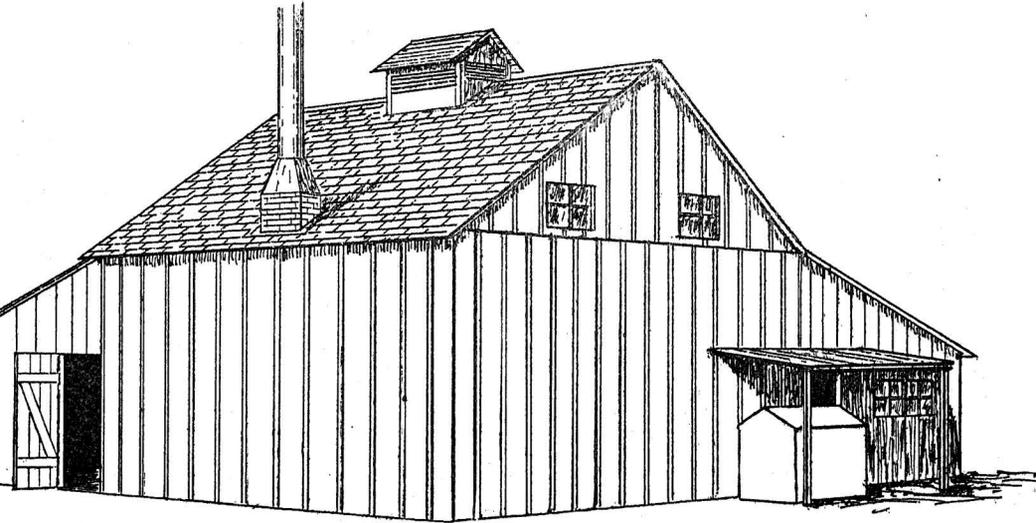


FIGURE II. SIDE ELEVATION.

The best and cheapest evaporator of to-day, for apples and peaches, may be constructed for as many hundreds of dollars as the others cost in thousands. All that is required is a plain frame building made of boxing well battened; a slatted upper floor about six feet above the ground for the fruit, and a stove on the lower floor. Almost any old, plain building, may easily be converted into an evaporator, and cheap, rough sheds may be built for the fruit and paring machines. This is all that is needed except the bleacher.

The building should be about 24x24 feet, and 12 feet to the eaves, and will require no bottom floor. It should be made of good, dry, 1x12 inch boxing, 12 feet long and securely battened. The floor joists should be placed about six feet above the ground and be 2x6 inches and 12 feet long, resting upon a support in the center of the building. (A building 12x12 feet, or 16x16 feet, would be large enough for most farmers or fruit men). The floor is laid with slats one inch square and beveled so that the fruit will not clog.

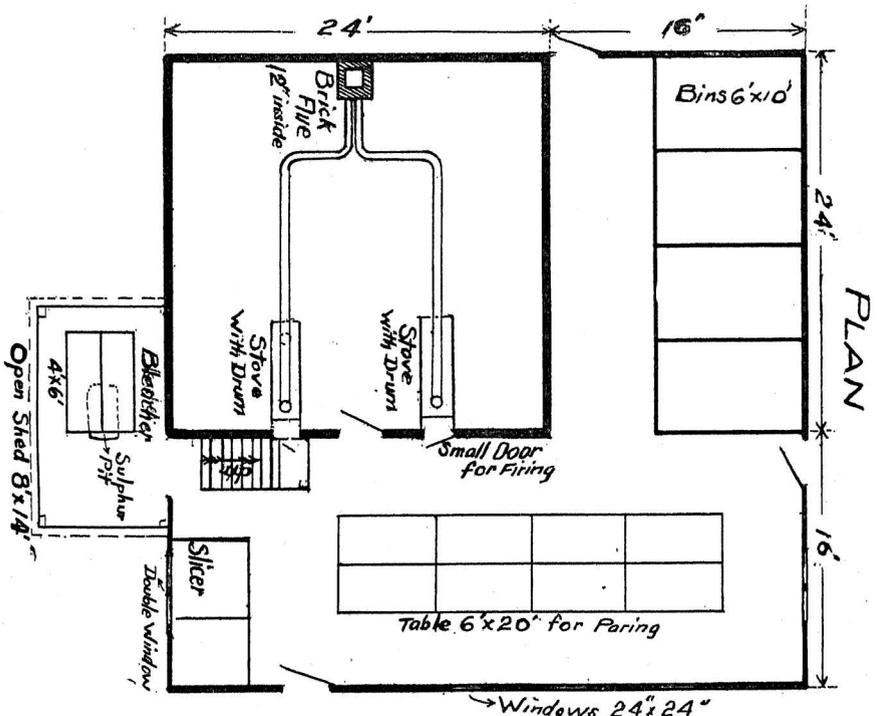


FIGURE III. FLOOR PLAN, SHOWING LOCATION OF STOVES, ARRANGEMENT OF PIPES, APPLE BINS, PARING TABLES, SLICERS, ETC.

See Fig. V. Nail these slats to the joists about three-eighths to one-half an inch apart, so as to allow the hot air to pass through. All of the space of this floor should be used for the drying room. No other floor is needed. This drying room will require plenty of ventilation above, for the moist, hot air to escape. A rough building will usually have plenty of cracks and holes, especially along the eaves, which is not objectionable. In addition to this, however, there should be one or two ventilators for the size of build-

ing here described. These should be in the ridge of the roof and made so they may be closed when necessary.

The flight of steps to reach the drying floor must be on the outside of this main part of the building, no matter if it be 12, 16 or 24 feet square, as all of the space in the room should be reserved for the fruit.

On the ground two large heating stoves with large drums and plenty of pipe leading to the chimney will answer for the furnace. These should be so placed that wood may be easily put into them from the outside, for, when in use, the stoves will need to be forced just as hard as it is possible.

After running the prepared fruit through the bleacher it is placed upon this slatted floor four to six inches deep

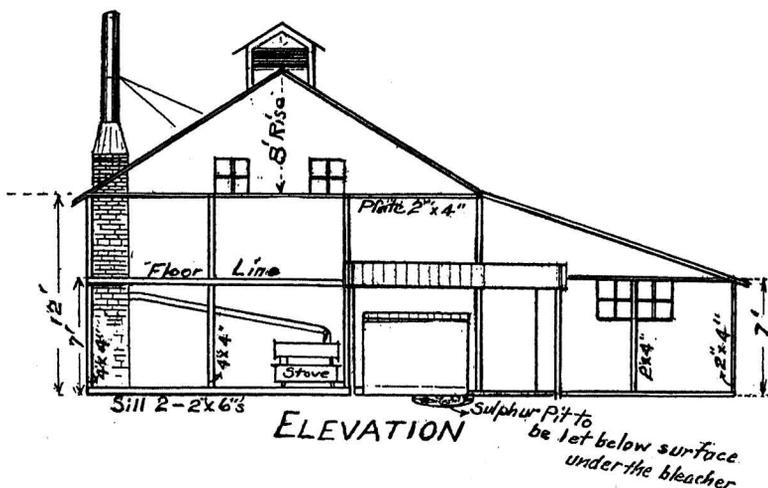


FIGURE IV. SECTION SHOWING METHOD OF FRAMING, ETC.

and stirred often. The thicker it is on the floor, the more stirring will be required. The stirring is done with a shovel and the fruit must be handled carefully.

The bins for the apples are always so as to be filled from the outside, and the fruit removed from the inside through the sliding doors. This fruit is carried in baskets or boxes and placed upon the tables where the paring is done, and as fast as pared, should be placed in boxes to be put upon the slicing machine. After slicing, they are dropped into trays made 3x3 feet, of galvanized wire and at once put into the bleaching house where the fumes of sulphur soon bleach the bruised and discolored parts to a pure

white. Care must be exercised not to leave the fruit in the bleacher too long or the flavor will be seriously affected. When properly bleached, none of the fruit flavor or quality is lost, which is always the case when bleaching is done after evaporation. The bleacher can be made to hold two sets of trays, end to end, and an opening made so that they can be taken out at each end, but it is much preferable to have an iron hook so as to draw them all out at the point nearest to the stairway leading to the drying room. As soon as bleached the trays of fruit should be carried immediately to the drying room and emptied on the floor. Only a few minutes are needed for the bleaching, so that

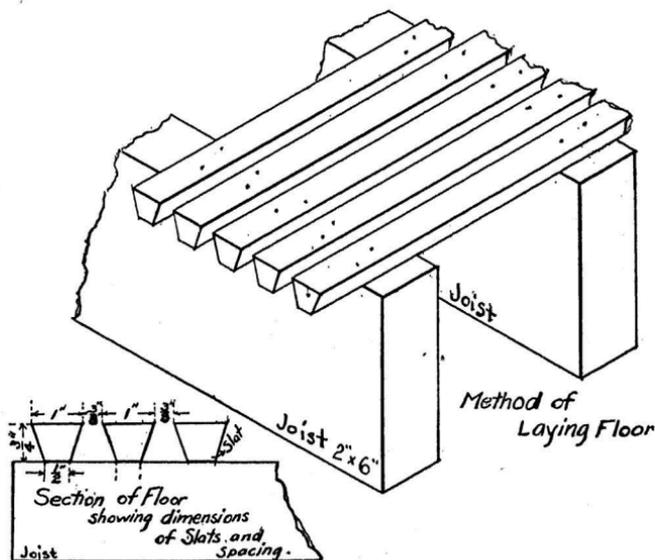


FIGURE V.

the trays can be kept in use all of the time by the slicing machines.

This prepared fruit must be put in as rapidly as possible on one side of the drying room so that it will all come out at once when ready for packing into boxes, otherwise a loss of heat and space will result. The same packing tables and the same help that do the paring of the apples may be used for packing the evaporated fruit. The boxes are lined with white paper and then two layers of the best rings are selected and put in the top of the box (the bottom when packing), and then the rest filled in carefully, rejecting anything too soft or too hard to make good fruit. The box

is packed tightly and is ready for market.

When the evaporator is not in use for the fruit itself, it can be used to evaporate the skins and cores, which will often sell for enough to pay the expense of evaporating the apples. Care will have to be exercised if this is done to wash everything clean before using again for the fruit, hence it is always best to keep a part of the dry room separated from the rest for this purpose alone, and use it for nothing else.

An examination of the plates here furnished will give a better understanding of the building and the plan of use than would any direct reference to the cuts while giving directions. A little exercise of judgment and common sense will enable one to soon become accustomed to the use of the evaporator and know how to manage all the details. There should be some familiarity with the work before attempting to push the evaporator to its limit. Experience will teach the operator the parts which require the closest attention.

If the dry room is 12x12 feet, or 16x16 feet, but one stove will be required. Wood is the best fuel to use and a large box stove is recommended. If wood can not be secured, then of course coal must be used, and if used then get all of the radiating surface possible by the use of large drums. Care must be taken to keep the pipes clean.

The following is an approximate estimate of the building material required for an evaporator 40x40 feet and the necessary paring shed :

Sills 2x6, 16 pieces, 192 feet board measure.

Posts 4x4, 12 pieces, 192 feet board measure.

Joists 2x8, 28 pieces, 448 feet board measure.

Plates 2x4, 12 pieces, 96 feet board measure.

Rafters 2x4, 675 feet board measure.

Sheeting 1x6, rough, 1,100 feet board measure.

Siding for main part, 1x12, 96 pieces, 1,300 feet board measure.

Siding for shed, 400 feet board measure.

Bins, 400 feet board measure.

Floor material strips 1x1 inch, dressed and beveled as shown in Fig. V.

Shingles, 12,000.

Glass, 44 panes 12x14 inches for glazing 11 windows 24x28 inches.