WOOD SLAT SNOW FENCE

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WOOD SLAT SNOW FENCE

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The use of the wood slat type of fence for snow control along highways has increased with the increased demand for open highways throughout the year. From a modest beginning about 15 years ago the use of snow fence now extends throughout the Northern States. The idea of mow fences is not new, nor is the manufacture of lath or slats new, but the use of slats woven together and set along highways is of such recent origin that it may still be classified as new. With a program far from complete there are already thousands of miles of fence in service. New installation plus replacement of old fence has created a demand for volume that has been of sufficient attraction to induce concerns to devote their entire attention to this business.

The manufacture of snow fencing is a type of small industry that should fit in well with many community forest management plans. It is not a line of manufacture that can be taken up without local study, nor is it suggested as a primary product except possibly in exceptional cases. It is, however, a product the use of which promises to grow with the development of highways. The fact that it is a bulky product means that manufacture should be close to where it is used. Its purchase is in the hands of semipublic agencies presumably appreciative of the advantages of encouraging local enterprise. Its manufacture can be from timber unsuited to other purposes. Timber need not be of high grade, but it must be of the proper species and in quantity sufficient to insure low-cost and sustained operation. There should be at least a nucleus in mill and woods crews of men who have been accustomed to timber work. The personnel of the business must include someone who is interested in details of cost and is at the same time a salesman. Failure of small enterprises can often be traced to too much attention to manufacturing and too little to selling the product.

The requirements after all are not very severe. Conditions obtaining in partially timbered districts are usually such that a small plant of this type can be introduced without encountering serious obstacles.

Favorable aspects of the fence slat business are several. The fact that the slat business is a growing one is interesting. Moreover, there is reason to believe that after the original installation the maintenance demand will be rather large and constant. The prospects are, therefore, that a management plan for timbered areas available to a community can definitely recognize the slat business as an outlet for centain classes of timber and accordingly can make provision for intelligent systematic cutting.

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[1] Maintained at Madison 5, Wis., in cooperation with the University of Wisconsin.

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From the standpoint of a woodland owver who divides his time between farm jobs and other work the slat business presents an opportunity that should be more favorable than the usual fuel wood business. It would be reasonable to suppose that cutting of fuel and cutting of bolts for slats would be a good combination, the poorer, rougher sticks going tnto fuel and the better ones into slat bolts. A plan might be developed whereby a number of farmers would enter into contracts to supply the slat mill with the required quantity of bolts. A satisfactory arrangement might be made whereby the mill would arrange for its trucks to call for prepared bolts at timber lots, thus making for more systematic and economical delivery.

Simple as is the slat business, it should be possible to effect cooperative organizations to handle everything from timber through to finished product. Dividend among a number of timber owners the small investment in a plant could be financed without difficulty. There are many interesting possibilities in the way of products, other htan slats, that might be manufactured by such a cooperative.

General Description

The highway snow fence consists of wood lath or slats generally 1/2 inch thick, 1-1/2 inches wide, and 48 inches long spaced about 2 inches apart and woven with wire into sections 50 or 100 feet in length and then rolled for convenience in handling. Ordinary plaster lath measures 3/8 inch in thickness by 1-1/2 inches wide by 48 inches long. In the earlier fence, plaster lath was common and even yet it is admitted in some localities. The standard fence slat is a considerably better stick then the plaster lath because of its additional thickness and because it admits fewer defects. In comparison with plaster lath the service it must render is severe. State highway departments usually have specifications that cover quality of slats, wire, painting, and the like, but often separate specifications are made covering individual transactions.

Manufacture of Slats

Snow fence manufacture lends itself to production in small units both with respect to slat manufacture and to weaving of fence. It requires small capital outlay for equipment and a minimum of skilled labor. Because of these factors it is feasible to operate on an intermittent basis. The business is somewhat seasonal, the period of greatest activity being in the autumn just previous to the time when fence installations are planned and made. It is therefore possible to fit snow slat manufacture in with other activities in the community, with varying labor demands, such as farm work or woods work.

Snow fence slats are made either as a primary product direct from logs or bolts, or as a by product of lumber manufacture.

A single unit bolt operation requires 7 or 8 men at the mill. An equal number of men is required in the woods cutting bolts to supply the mill. In addition, one or two men are needed for transferring the slats

from the mill to the point of storage. Thus the slat operation will employ about 16 men when the mill is running. It is practical to use the same crew for both woods and mill work and in such way double the length of working period. The crew can work in the woods until an ample supply of bolts has been accumulated, and then it can shift to the mill.

Fortunately a slat operation will take a class of timber considered inferior for lumber. It introduces possibilities for utilizing small timber from woodlots, thinnings of good quality, and inferior logs usually left on cutting areas after the logs merchantable for lumber have been removed.

Manfacturing Equipment.--Equipment for the manufacture of fence slats from bolts is relatively simple and inexpensive. The equivalent of about 50 horsepower, steam, is sufficient to run all machinery. The power plant may be a stationary or other form of steam plant, gas tractor, converted auto engine, or electric depending upon local circumstances. If there is no profitable outlet for mill waste a steam plant will likely be the most economical.

The headsaw may be a simple, power-operated carriage without set and dogging works, or it may be one of the many types of short log bolters. The headsaw simply breaks the bolts down into cants or planks equal in thickness to the width of a slat. The next machine is some form of a gang ripsaw that takes the planks from the headsaw and rips them into slats of proper thickness. The third machine is a push-table type of trim saw that cuts the slats to proper length after they are bundled. The bundled slats are then ready for transfer to the storage pile. A conveyor is needed to keep the sawdust from accumulating at the headsaw and rip saw. The entire mill layout, including a shelter for the machines and operators, will cost not to exceed $1,600.00 at 1936 prices.

It is important to use as small gauge saws as possible. The small size of the product entails many cuts, and heavy gauge saws result in prohibitive waste. It is practical to use a headsaw cutting a kerf of 3/16 inch and a ripsaw with blades cutting not to exceed 1/8-inch kerf.

A cord of bolts ranging in diameter from 5 inches to 15 inches will yield 1,000 to 1,200 slats of standard size and quality. Additional slats of shorter length can be cut from waste but whether this is practical depends upon outlets for such stock.

The cost of production of slats from bolts will average about $5.25 per thousand, including cost of bolts. The selling price of slats is about $6.50 per thousand, thus giving a margin for profit of about $1.25.

The cost of production will vary considerably depending upon quality of raw material, cost of layout, and efficiency of crew. Too small bolts run up production costs. Although the difference in cost between the handling of 6-inch bolts and 10-inch bolts is not great, a 10-inch bolt will yield about three times as many slats as a 6-inch bolt;.

The snow fence slatmill can, of course, be used as a plaster lath mill simply by a different setting of the saws. It is possible, therefore, to turn to plaster lath whenever the snow fence business is inactive or when the price of plaster lath is high enough to insure satisfactory profit. Since plaster lath admit more defects than fence lath and also different species it is sometimes feasible to separate the bolts into two grades, the better ones for fence lath and the poorer ones for plaster lath.

Some manufacturers have tried resawing poor fence lath into plaster lath, but the labor and machine costs usually eliminate the chance for saving. If the market can be found it is more profatable to rework the poor 48-inch lath into 32-inch or 36-inch lengths. Such trimming is an inexpensive operation compared to ripping 1/2-inch lath to 3/8-inch thickness.

Occasionally a buyer will accept a certain percentage of No. 2 fence slats. This is a fortunate arrangement, for otherwise the No. 2 slats may be almost a total loss.

Specification for Bolts.-- To insure a grade of bolts that will work up economically into snow fence slats there should be specifications defining closely the quality of material that will be acceptable. In lieu of standard specifications it has been the practice for each operator when buying bolts to draw up specifications that meet his particular needs. Rough though they may be they are a basis for understanding between buyer and seller. When an operator is using timber which he has bought on the stump, or where he is cutting woodlot timber he can afford to take greater chances, for is the bolts do not open up well at the mill be is simply out the labor. Circumstances determine the quality of material acceptable for each individual operation but the same general principles are involved in all specifications. Specifications will state:

1. Species that will be accepted.
2. Purchase price.
3. Length of belts or logs.
4. Diameter of bolts or logs at small end. (The diameter may vary for the different species accepted.)
5. The extent to which surface defects, such as knots, Will bo admitted.
6. Limitation on rot.
7. Limitation on crook and sweep.

Slats from Mill Waste.--There is nothing particularly new about making slats from mill waste, for it has been common practice for many years to make plaster lath in this way. The only difference is that fence lath are a little thicker and of somewhat better quality. Lumber manufacture leaves thick slabs and edgings that contain a lot of good material, in fact the best part of the log is often in the slab or outside portion. The larger, better slabs are picked from the waste conveyor and then resawed into lath.

In railway tie manufacture logs and ties having excess length are trimmed back to standard tie length and the sections trimmed off, provided they are over 4 feet long, are sometimes reworked into fence slats. Waste

to be used for slats must be fairly easy to rework for slats are a cheap product and to be remunerative the operation must be fast and the yield large for the amount of labor expended.

After slabs have bean crosscut by the slasher three machines are required for reworking them into slats. The first machine is the lath bolter that reduces the slabs into strips as thick as slats are wide. The next machine is the lath mill that rips the strips into lath. The lath bolter and lath mill are equipped with gang saws for multiple cutting, The third machine is a cut-off saw that trims the slats to proper length after they have been bundled. The bundles are then ready for storage.

Six men are required for the operation: a stock picker who picks desirable material from the waste conveyor and places it on a transfer running to the lath bolter; two men at the lath bolter, one feeding the machine and the other taking away; two men likewise at the lath mill; one man bundling slats and trimming the bundles to proper length, Additional labor is required to transfer the bundles to the yard and store them.

In most cases the cost of production with this method is not easily figured, but if slabs definitely have a fair market value as fuel the cast will be but slightly under the cost of manufacture from bolts.

Species Admitted.--Slat specifications are liberal in the matter of species they admit. Woods that are barred, some by one state and some by another, are aspen, basswood, cottonwood, elm, and gum. Chief among the reasons for classifying these woods as undesirable is their tendency to warp when dried under rather haphazard conditions. Warped slats are a serious hindrance to smooth operation of the weaving machines.

Preferred woods are the pines, spruce, Douglas-fir, cypress, and soft maple. Other woods comonly used are oak, birch, hard maple, Western larch, and tamarack. Heavy woods, excellent from the standpoint of strength, are more or less in disfavor on account of the weight difficulty they introduce in one man handling of large rolls. If the average bending strength of a number of oaks is assumed to be 100, then comparatively Northern white pine has a value of 63. Yet pine is a preferred wood. This example illustrates how far the user is willing to go in sacrificing strength in order to get light weight material.

At 12 percent moisture content, approximately an air dry condition, the weight of 100 feet of Northern white pine fence is 183 pounds. On the same basis white oak weighs 349 pounds, practically twice as much. Extreme differences such as these suggest that the range of preferred woods might be extended if it were generally specified that the fence of the heavier woods should be done up in bundles of 50 feet and those of the lighter woods in 100 feet.

Durability of Fence Slats

Inherent durability of woods has been a minor consideration partly due to the hidden principle of sound design in this method of fence assembly, viz., that the slats are virtually hanging in the air with no contact with the ground and with no bearing of wood on wood to form moisture pockets. Experience has shown that most cases of failure in fence are due to rusting and breaking of wire at the point of twist. Specifications aim to insure as good wire as is consistent with the use, but in spite of this the twisting process in weaving tends to crack the zinc coating and once this occurs it is only a question of time before rust weakens the point to the extent that rolling and unrolling the fence in the process of installation and summer storage causes breakage.

The use of better wire emphasizes the importance of durable woods and the value of good summer storage methods. Generally speaking, road workers recognize the immportance of keeping fence bundles in storage off the ground and away from clumps of vegetation, but nevertheless examples of careless storage are common.

Almost universally snow fence is dipped in a water paint before leaving the weaving factory. The dip is generally a mixture of red oxide of iron which from the standpoint of retarding decay is valueless. Effective preservative treatment with creosote or other agents has not been attempted, although there is some sentiment in favor of the practice.

Snow Fence Weaving

The manufacture of snow fence is an operation requiring but little space, equipment, and power. The process entails feeding slats into a machine between five double strands of wire and then putting twists in the wire between adjacent slats. Up to this point the operation is practically automatic. As the woven fence comes from the machine it is cut into lengths 50 to 100 feet long, stretched, rolled, dipped in a tank containing a water paint, and is then ready for delivery.

The cost of a weaving machine together with supplementary equipment is about $1,000. It operates with about two horsepower and a crew of five men. Output is 500 to 700 lineal feet per hour. With slats 2-1/2 inches wide spaced 2 inches apart there are 350 slats per hundred feet of fence. Slats are, therefore, used at the rate of about 2,000 pieces per hour.

Steel posts to which the fence is usually attached in use are the product of metal working establishments.

Ordinarily slat manufacture and fence weaving are operations carried on at diffferent places, the former near the supply of timber and the latter in some distant town. Located at some good distributing point there is no reason why the two operations could not be carried on together. As a phase of a community project the weaving operation would furnish work for several men for a 2 or 3-month period. Slats cur previous to mid-summer are air

dry and ready for weaving by early fall. Thus fence weaving can follow slat manufacture and the same crew can be used for both or if the volume of business justifies the two can proceed simultaneously.

Snow Fence for Uses Other than Snow Control

Although the snow fence market is a promising one there are definite limitations as long as snow control is its chief use. The far West and the South cannot compete with material cut locally and manufactured in the Middle West and eastward. Freight on Douglas-fir slats shipped to Minnesota is equal to the mill price of the slats themselves. Thus, they are quite definitely out of that market. The southern pine situation is about the same. If, however, the other potential uses for snow fence are developed lumbering sections of the country outside of the snow belt are not without outlets for the same or similar types of slat fence.

An important use from the standpoint of quantity marketed is for temporary silos. It is reported that in 1934 there were 22,000 of these in use on farms. This is equivalent to more than 400 miles of fence. For a use of recent development this is a very creditable showing.

Other purposes for which snow fence is already used and might be used are the following:

Fences around athletic fields, playgrounds, fair grounds, general farm fence, such as chicken and sheep, guard fence around excavation for buildings, gravel pits, quarries, trenches for pipe lines, fences around vegetable and flower gardens to exclude children, dogs, and rabbits, fences to control drifting sand, children's play yards, dog yards, screens for dumps or waste areas, temporary retaining walls, shade screens for nurseries, ginseng beds, shade frames for stock in exposed pastures, temporary grain bins. There is the possibility that ornamental fencing might be made using the principle of snow fence manufacture and installation but somewhat heavier slats so shaped, spaced, and supported as to provide a simple, low-cost fence.

It would no doubt be advisable to coin some new term to take the place of "snow fence." Possibly "slat roll fence," or a term of such type would be mare fitting when applied to southern uses. The term might even be used to advantage in the North in view of the fact that the uses outside of snow drift control are so numerous. It is conceivable that a well chosen term would serve as a medium through which the market for the fence could be appreciably broadened.

It is logical that snow fence be marketed through dealers in road and farm equipment and would be reasonable to suppose that retail lumber dealers would find snow fence a side line that would work in well, but as yet little of it is handled in that way.

Metal Snow Fence

The wooden slat snow fence is not without the threat of competition. At least two types of metal fence have been introduced, one consisting of 24 or 26-gauge steel rails hung on metal posts, the other employs corrugated steel pickets.

The use of steel fence is increasing year by year, but whether it is getting its share of the general increase in the use of all types of snow fence is conjectural. As would be expected the initial cost of such Pence is greater than for wooden slat fence. Neither type of fence has been used long enough to enable drawing conclusions as to comparative length of service.

Since steel fence is intended for and is serviceable for only one use it is considerably handicapped. Initial cost, transportation and handling costs necessitate the use of light gauge steel. Range of use is restricted due to the fact that under impact the rails are subject to bending and crumpling. Nevertheless, the fact that the steel fence is definitely in the field makes it imperative that those interested in wood slat fence keep their product up to high standards.

Figure 1.--Wood snow fence set for drift control along highway.

Figure 2.--A portable slat mill.

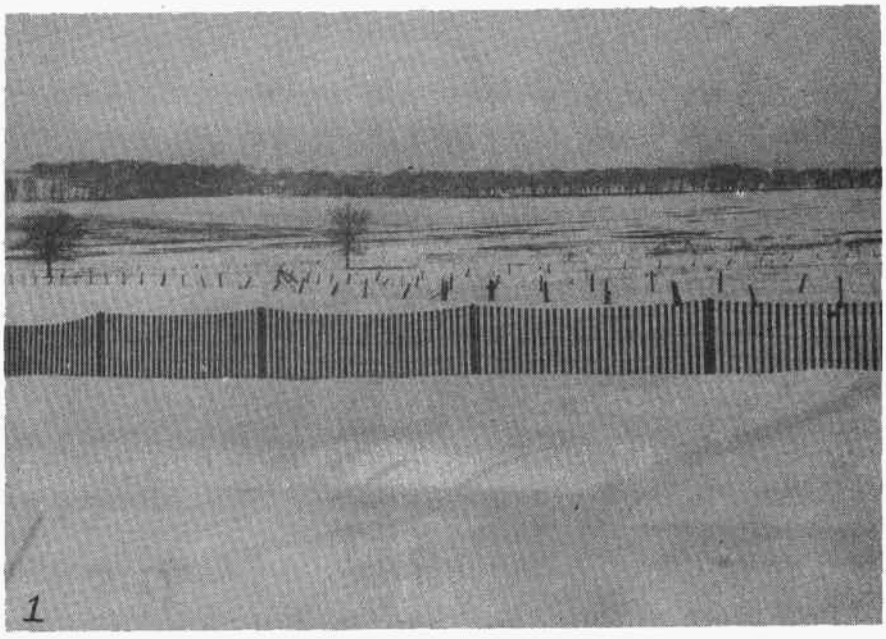

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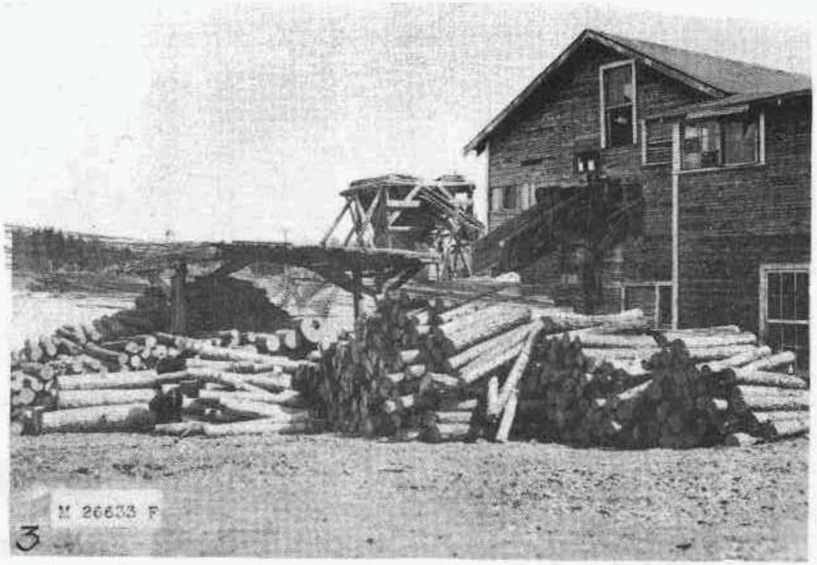
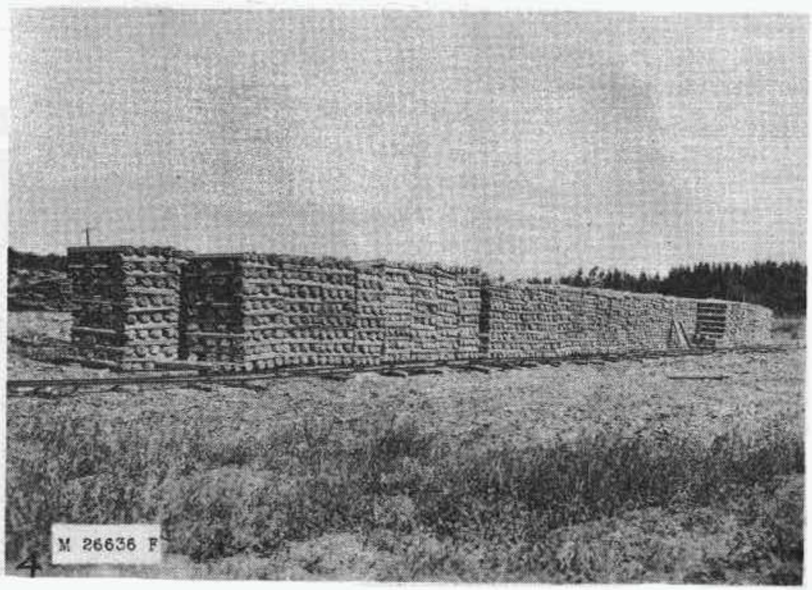
Figure 3.--Slat mill of permanent type. Bolts ready to go up log slip into mill.

Figure 4.--Bundled snow fence slats being air dried previous to shipping to weaving factory.

Figure 5.--Miscellaneous sawmill waste to be cut into fence slats.

Figure 6.--Excellent storage of snow fence.





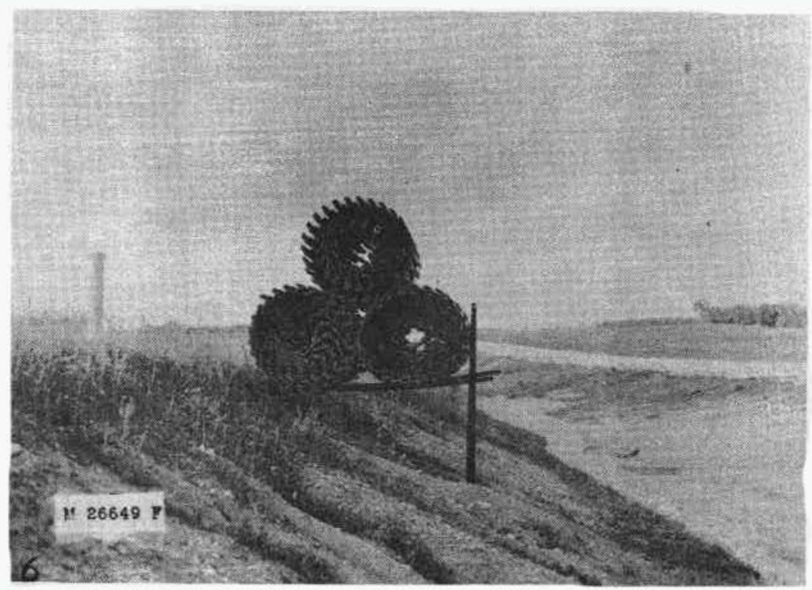


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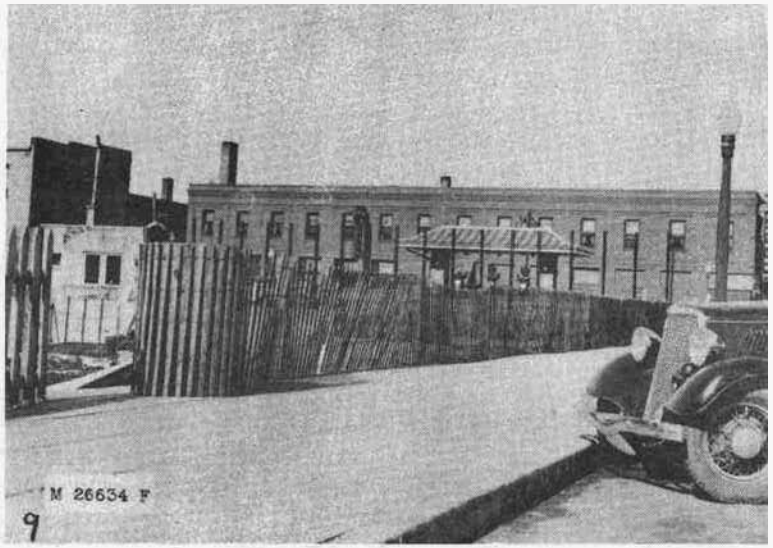
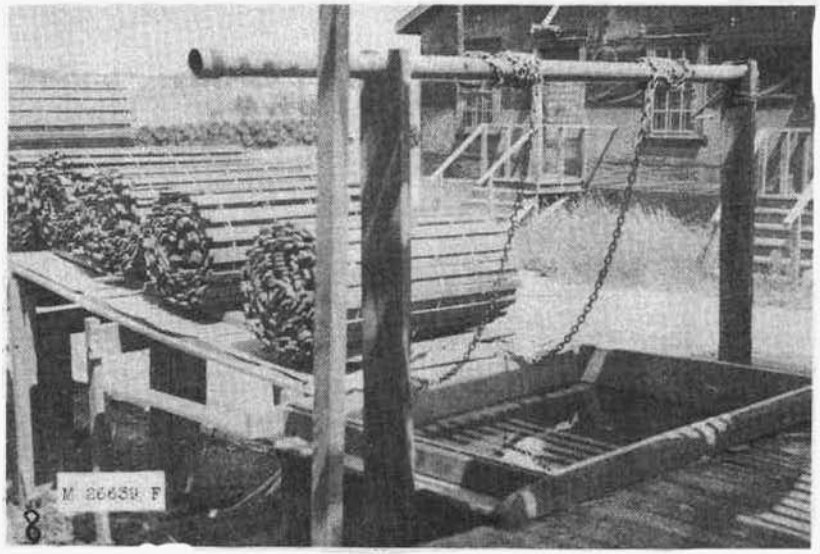
Figure 7.--Poor Summer storage of snow fence. Over grown rolls exposed to heavy decay hazard.

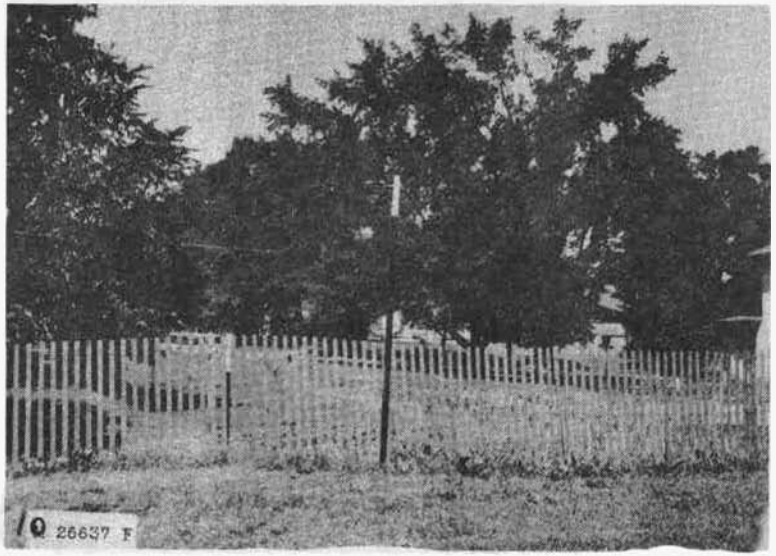
Figure 8.--Snow fence dipping tank at the weaving factory.

Figure 9.--Snow fence as temporary barrier.

Figure 10.--Snow fence enclosing residence property.







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