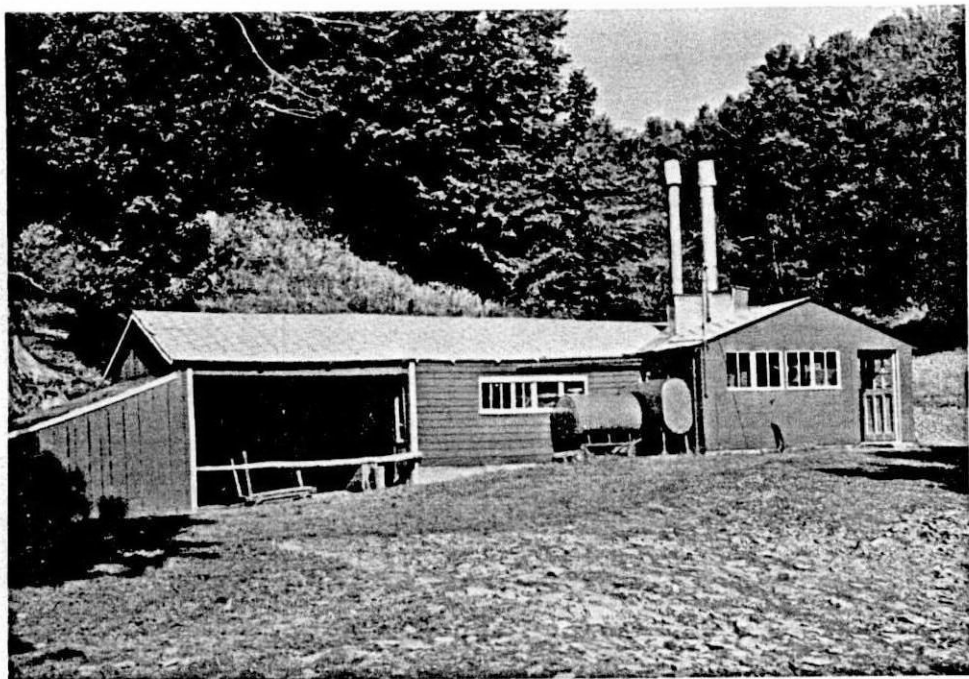


NATIONAL MAPLE SYRUP DIGEST NATIONAL



Vol. 12, No. 1

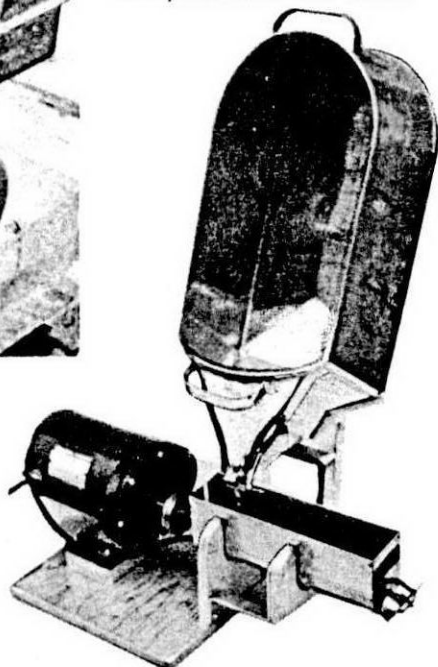
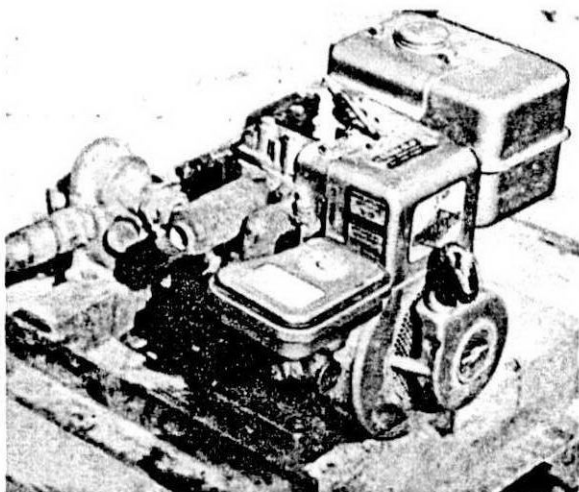
February, 1973

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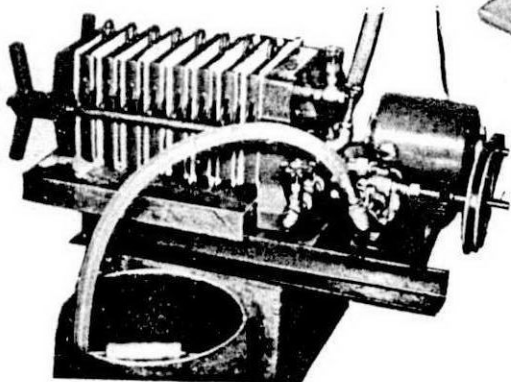
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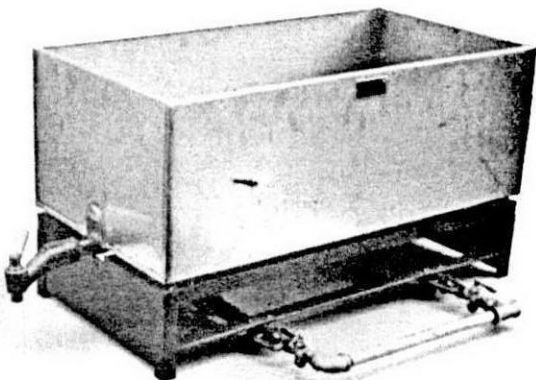


MAPLE SYRUP FILTER PRESS

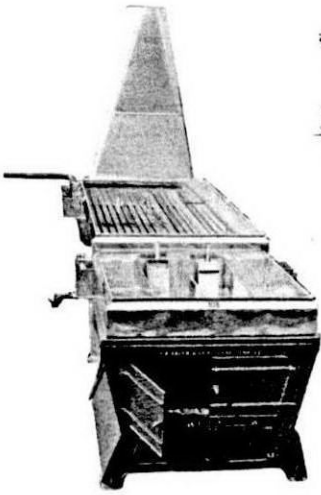
Takes out all dirt and sugar sand. Electric motor operates a bronze gear pump to push hot syrup thru filter and lift it to any height. Capacity 2 gallons per minute.

GAS FIRED FINISHING PAN

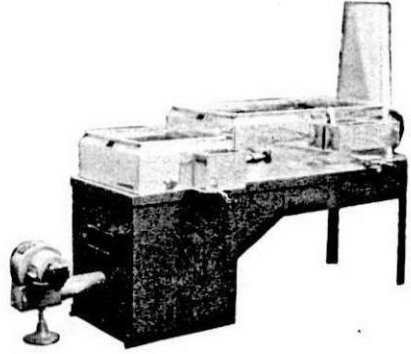
A new gas fired finishing pan for the smaller sized evaporators. Also ideal for making cream and sugar. Rugged base and fittings.



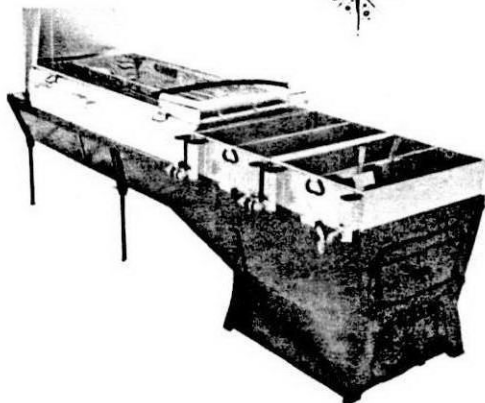
WOOD & OIL BURNING _____
EVAPORATORS



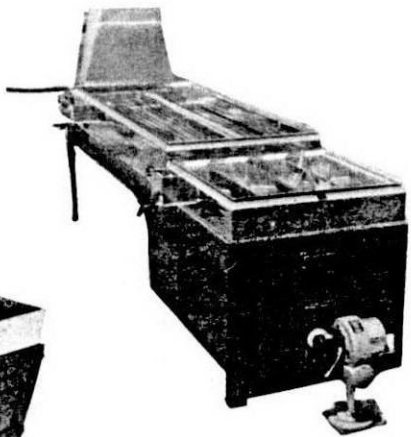
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3' x 10' GRIMM EVAPORATOR



4' x 14' OIL LIGHTNING

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Printed by York Mail-Print
Bainbridge, N. Y.
 Edited by Lloyd Sipple
Bainbridge, N. Y.

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NATIONAL MAPLE SYRUP DIGEST

Published by: Lloyd H. Sipple
R.D. # 2
Bainbridge, N.Y.

Published four times a year.
(Feb., July, Oct., Dec.)

Postage

Paid at Bainbridge, N.Y. 13733
Mailed outside our circulation
area for \$2.00 per Year.



Printed by:
YORK MAIL-PRINT, INC.
Corner of Pruyin & Parsons Sts.
Bainbridge, New York 13733

COVER PICTURE

The neat, well maintained sugar house of Carroll Burdick, Andover, New York. A creek that comes out of the hollow on right, almost washed out the building in "the flood" last June. Photo was taken during N.Y. Maple Tour in August after creek was repaired.

DIGEST ADVERTISING RATES

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Editorial

I am still getting complaints from some producers who are not receiving the Digest. At least part of the time this is probably my fault, but not always. I'm trying my best to get the list up to date so that everyone is included who should be, but at this writing, I still haven't received the corrected mailing lists from some states, which were requested in October, 1971. And while I'm complaining, I might as well air a few more gripes.

Quite often new names are sent in with no zip code. To include it would require this person to spend about two seconds or less to merely write it down. It takes me sometimes several minutes to look it up in the official zip code directory, that little monster that contains over 1600 pages of fine print.

Occasionally, the wrong zip number is sent. This is worse because we won't know it until the postal service returns it marked "incorrect address." It costs 10c to get the return back, 15c to remove the old plate from the addressing machine, 25c to make a new one, and 8c to mail a single copy to the addressee and, of course, the original 5c postage was wasted.

I've had a few write requesting a change of address. They sent the new address, but not the old one. If it's not in the same town, how do I know where to find it so that it can be taken out? Another copy wasted until the post office gets around to return it, which costs 10c again. Frustrating? You haven't seen anything yet.

We get everything imaginable in the return envelopes, like the one in the centerfold of this issue. Some claim to send a certain amount of money but

neglect to enclose it. Others include the money but don't bother filling out the name and address or else write it differently than it is on our list, but don't ask to have it changed. So, should I change it or not — a good question. Anyway, thank heavens most checks are printed now. Signatures are almost impossible to read.

A few times I've received return envelopes all filled out properly with a contribution enclosed. About a year later I find out that, while it didn't say anything to that effect, it was supposed to be a new name for our list. What happened was, a new producer, who wanted to start getting the Digest, borrowed the envelope from his neighbor who didn't intend to use it anyway. I guess it was pretty stupid of me not to know this. If I had just checked through the 7000 cards in our file, I would have seen it was a new subscriber but I guess I was too shiftless to bother.

But to top it all off, I've received four or five return envelopes with absolutely nothing inside. No name, no address, no contribution. This "nothing" which cost the Digest 10 cents, is from someone who thinks it is a big joke, but is actually the owner of a sick mind.

Well, I've wasted enough space on my problems, let's talk about yours. Your first problem is what to do about the enclosed envelope. I hope you will use it "generously." If you don't, your state maple producers organization will have to kick in more next fall because someone has to pay the bills. With the increase in the price of syrup this past year, I think the maple business has been pretty good to all of us. Why not pass along just a little of it to the Digest?



IF YOU MAKE MAPLE SYRUP YOU NEED OUR CATALOG

HERE ARE JUST A FEW OF THE ITEMS AVAILABLE



MODERN SAP COLLECTION
Throw-Away Bag



Trouble With Moldy Syrup?
Use FERMIBAN
Inexpensive!



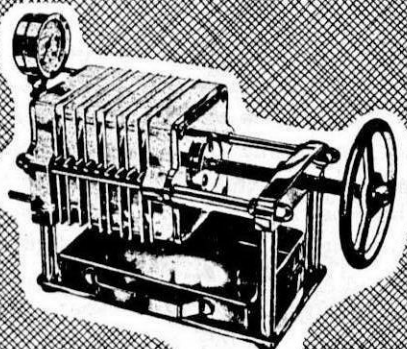
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For Leaky
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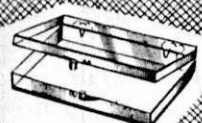


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SUGAR BUSH INC.

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SAP PRICES

Last year we published an article by Richard Howard, R. D. & D., Norwich, N.Y., which included a schedule of sap prices for the last three years which were paid by a New York buyer.

We are reprinting the chart, adding another column for 1973, and correlating the prices with the comparative selling price of syrup, both retail and wholesale.

Year	1971	1972	1973
Retail	8.50	9.00	10.00
Wholesale	6.40	6.80	7.90
Sap Brix	per gal.	per gal.	per gal.
1.5	.022	.023	.027
1.6	.025	.035	.039
1.7	.030	.044	.049
1.8	.038	.052	.057
1.9	.048	.059	.064
2.0	.06	.065	.07
2.1	.064	.070	.075
2.2	.068	.075	.08
2.3	.072	.080	.085
2.4	.076	.085	.09
2.5	.08	.090	.095
2.6	.084	.094	.10
2.7	.088	.098	.105
2.8	.092	.102	.11
2.9	.096	.106	.115
3.0	.10	.110	.12
3.1	.103	.114	.124
3.2	.107	.118	.128
3.3	.110	.122	.132
3.4	.114	.126	.136
3.5	.118	.130	.142
3.6	.121	.134	.146
3.7	.125	.138	.15
3.8	.128	.142	.154
3.9	.132	.145	.158
4.0	.136	.149	.162

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BULK SYRUP

IS RE-HEATED SIRUP DARKER?

Robert R. Morrow and Lewis J. Staats

Department of Natural Resources
Cornell University

Numerous producers hold maple sirup in drums or tanks and later re-heat it for packaging. This practice has several advantages:

- (a) Better density control. The final sugar content (Brix) is more easily controlled from a sirup finishing pan than from an evaporator. Also light and heavy sirup from different drums can be mixed to control density.
- (b) Better workload distribution. Packaging can be done when other work is less pressing.
- (c) Better and more uniform sirup. Dark amber or even darker sirup with good flavor can be mixed with light amber sirup to produce a predominance of high quality medium amber sirup.
- (d) Sales throughout the year with fresh, clean packages and less shelf storage space.

It is well known that long, continuous heating darkens sirup. How much does re-heating sirup darken and de-grade the packaged product? In 1971 we took sirup of 65 or 65.5° Brix, heated and boiled (evaporated) it to 66° or higher Brix, and noted that some sirup was visibly darkened. To avoid excessive re-boiling, we drummed our 1972 sirup at higher densities (66 - 67° Brix). Thus the sirup needed re-

heating, but no additional boiling, prior to packaging.

Of some 350 gallons of sirup packaged over a 4-month period, we made careful records on 9 batches that averaged 15 gallons each. Initial density (cold sirup) was 66-67° Brix and final density (hot sirup) was about the same. Only 2 batches increased in density (0.5° Brix), most remained about the same, and a few decreased in density (water added). Thus most sirup was heated to near the boiling point, but without actually boiling. All sirup was medium amber and heated by gas in the finishing pan for 25 to 50 minutes.

Batch samples, taken before and after heating, were compared for color change. In one batch, the heated sirup was slightly darker, but still the same color grade (medium amber). In still another batch, the heated sirup was much darker (dark amber). Inasmuch as the latter batch was the smallest and received the least heat treatment, we are unable to explain why it darkened.

These results suggest that good quality medium amber sirup, already at desired density, can be re-heated for packaging with little or no noticeable color change. Further testing is needed for different grades of sirup, initial densities, and packaging conditions. —

LES JONES' "Do It Yourself" instructions available. For economy buy your burner locally; use "Do It Yourself" DETAILED Instructions for easy and CORRECT installation.

Mrs. Les Jones

Holcombe, Wisconsin

54745

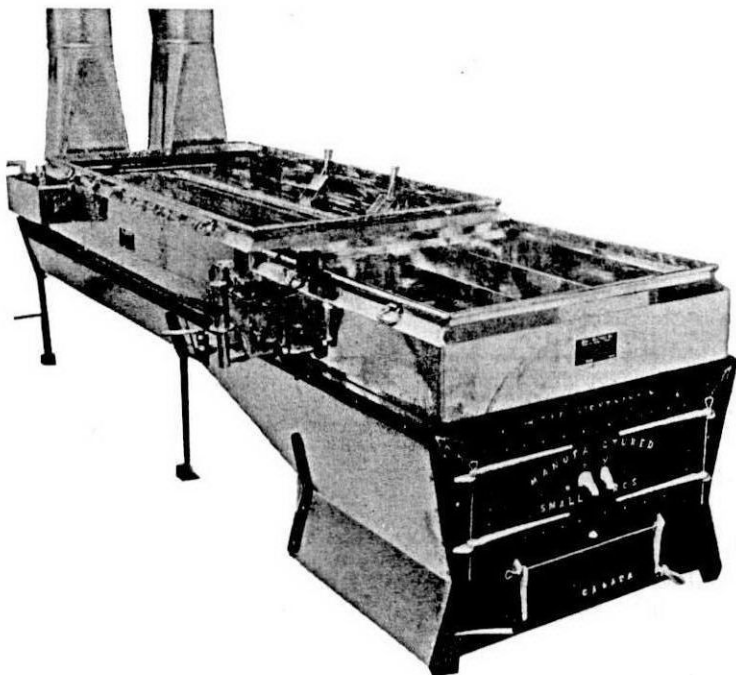
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Dunham, Quebec, Canada. Telephone (514) 295-2441

LEASING OF A SUGARBUSH

by Kenneth Bascom

Near-automation in the sugar house, the replacement of buckets by tubing, and the use of sap pumps have combined to bring about a drastic change in the sugar bush.

The evaporation of sap is no longer as much of a problem as obtaining enough of it to utilize the full potential of the well-equipped modern sugar house. Few family farms have sufficient numbers of maples to provide this much sap; therefore, the operator must either (1) buy sap, (2) use trees owned by another, or (3) both.

On the home farm we found years ago that neighbors had unused maples that were actually more accessible to us than some of our own. Soon we were tapping these under simple unwritten agreement with these landowners and with a varied level of payment. One party received 5c (later increased to 7c) per tap for the use of forest trees. Others accepted a gallon of syrup each year for the use of 100 to 200 roadside trees. Another with an unusually good 700 tap lot receives \$200 plus one gallon of syrup as his payment.

1972 also found son number one ambitious to build the home business to a level that would support two families. This meant not only adding equipment at the sugar house but finding and leasing thousands of trees under some arrangement that would, by formal and written agreement, insure us the right to use them year after year, continuously.

Tubing, tanks, pumps, and perhaps a truck would involve considerable cash outlay and many man-hours of labor. Some of the lots would need the removal of evergreens. To get deeply involved only to have a landowner shut us out was much too great a risk to take without well considered formal leasing.

As of January 1973 we have signed leases with four landowners and much new tubing is in place. No two leases are exactly alike as no two sugar bushes or two land holders are quite alike.

The purpose of each lease is protection for both parties. To avoid misinterpretation it is written in sections, which, in abbreviated form, are as follows:

Section I - Date that lease takes effect, full names of landowner and renter, and termination date of the lease. Our shortest lease is 5 years, the longest ends on June 1st 1983. Each has an option to renew. Should landowner desire not to renew he must notify renter in writing no later than June 1st of the year prior to termination date.

Section II - Land Use; states that land is rented only for removal of sugar maple sap, coniferous growth may be removed by renter, a mutually agreed upon program of weeding and thinning may be undertaken, and no sawlogs may be cut without landowner consent. Also stated (and you may find these controversial) are:

1. Tapholes will be at least 6" from previous years.

"SUGARING - '73" — IT'S JUST ABOUT HERE!

- Apparent prices for 1973 appear about stabilized with the average prices of 1972 which, of course, were very good. "Good prices" of course demand a "Good product". Be sure your "good product" is produced in the highest "quality conditions".

- Need syrup drums? Get your order in at once to VMSMA for 30 gal. epoxy lined drums (approx. \$10.00 each). Remember, VMSMA also has syrup cans, cartons, name and grade tapes, posters, graders, etc.

- Don't forget that rip-roaring maple event of the north country. "The Franklin County Maple Festival," April 6, 7, 8, 1973, held in St. Albans, Vt. For further information write: Maple Festival Council, St. Alban, Vermont 05478.

- In these days of high prices, consumer protection, price freezes, quality control, etc., it's important to you producers to have an association to represent your interest in matters vital to your operation. Join and support VMSMA so your association will be able to represent the majority, not minority of maple producers. It's a very cheap price to pay for guarding your interest! Dues \$2.00 per year. Send to assoc. Sec., Mrs. Carolyn Perlay, RD 1, Richford, Vt. 05476. For all other above supplies contact Assoc. Sec.

VERMONT MAPLE SUGARMAKERS ASSOC., INC.

2. Trees under 9" d.b.h. will not be tapped, there will be only one tap on 9" to 13" trees, 2 on 14" to 18", 3 on 19"-23", 4 on 24"-28", 5 on larger ones.

(This I dislike—who wants to use a tape measure?)

3. Present paraformaldehyde pellet will not be used, however should research produce a substitute proven not to injure trees, renter may use same at own discretion.
4. Renter may code trees with paint and may keep storage facilities, piping, and tubing on landowner's property year-round.

Section III — Payment: Amount, inflation-deflation, time. Renter shall pay 10c per tap for 1973 season. Each

year thereafter, to compensate for inflation or deflation of value of sap amount of payment shall be tied to that year's delivered sap price at K. Bascom's sugar house or, at landowner's option, to price printed in annual N. H. Forest Market Report. 1973 delivered 2.0% sap is at 7.2c per gallon. After 1973 for each .1c increase or decrease in price the payment per tap-hole shall increase or decrease an equal amount. Example: (If 2.0% sap were 8.2c per gallon, landowner gets 11c per tap) One half the payment is due by June 1st, balance by December 1st.

Section IV — Liability: Says in effect that renter assumes all responsibility and liability for accidents occurring to himself or his employees.

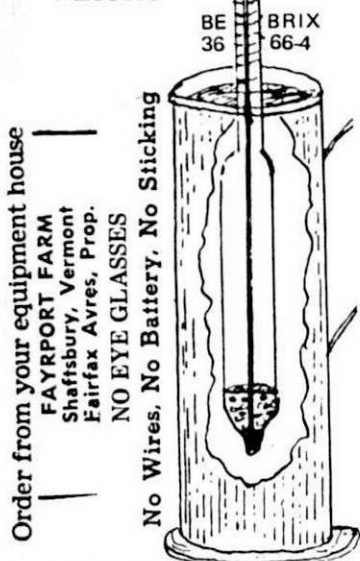
Section V – Renter agrees to:

1. Follow approved sugar bush management practices and to perpetuate the maples.
2. Obtain landowner's permission for any improvement work, this to be given at sole discretion of landowner.
3. Neither assign the lease or sublet any part of the contract without written consent of landowner, except as provided for in section VIII, No. 2.

Section VI – Landowner agrees to:

1. Pay real estate taxes.

**TRUE
MAPLE SYRUP
WEIGHT**



THE HYDROTHERM

INDICATES STANDARD WEIGHT MAPLE SYRUP JUST DRAWN OFF, OR STANDING NOT TOO COLD IN STOREROOM AT ANY TEMPERATURE BETWEEN 210F AND 35F

If the TIP OF THE RED floats even with surface of syrup it is standard weight—36 BS.- 66.4 Bx

If TIP rides high syrup is heavy. Draw off light syrup into pail, STIR with cup. Test new sample. Keeping adding light until RED TIP floats even.

If RED TIP can not be seen, syrup is high; boil more.

2. Allow renter access to area, including use of existing roads and possible development of new ones.
3. Allow renter to receive gov't cost share on sugar bush improvement work.

Section VII – Rights and privileges.

Landowner may enter and inspect his property and management methods used. Renter has no rights beyond those connected with harvesting of sap.

Section VII – Enforcement, arbitration:

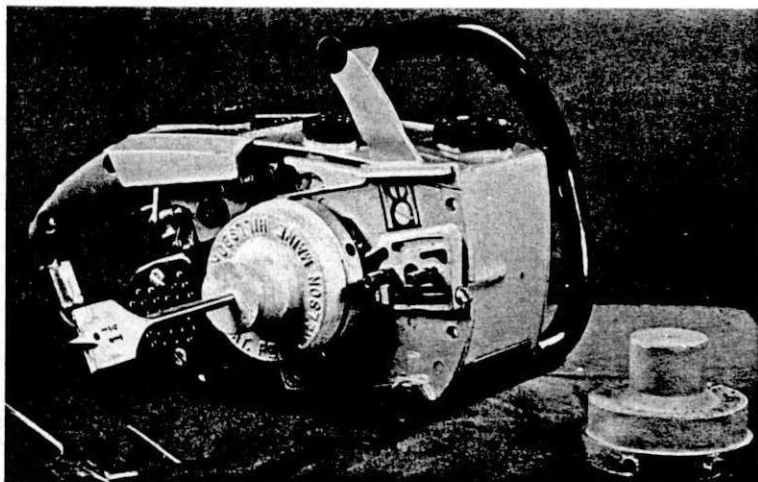
1. Failure of either party to comply with agreements of lease makes him liable for damages. Any claim must be presented in writing at least ten days before the termination date of the lease.
2. Should renter become physically incapacitated so he cannot operate the sugar bush, the lease shall not be binding upon the renter and may be assigned to other parties mutually acceptable to landowner and renter for remainder of the lease. Should the renter die this lease shall continue to be binding on his heirs and assigns.
4. Disagreement between landowner and renter shall be referred to a board of three disinterested persons, one of whom shall be appointed by landowner, one by renter, the third by two thus appointed. Their decision shall be binding on the parties to the lease. Any costs for such arbitration shall be shared equally by the two parties to the lease.

Section IX – Signatures.

Dated and signed by both parties, may be recorded with Register of Deeds for a small fee.

E-Z-TACH

DRILLING ATTACHMENT FOR CHAIN SAWS



- **INSTALLING TIME LESS THAN 5 MINUTES**
Remove Bar & Chain With Wrench Furnished By The Saw Manufacturer.
- **SPEEDY DRILLING**
Holes From $\frac{1}{4}$ inch To $1\frac{1}{2}$ inch Can Be Drilled With Ease. Flat Speed Bits Are Used and They Are Ground To Cut Counter Clockwise. A $1\frac{1}{2}$ inch Hole Can Be Drilled In Hard Wood At About 1 inch per Second.
- **SAFETY**
Since This Attachment Is Mounted On The Outside Of The Clutch Drum, The Drill Will Stop With The Motor At Idle.
- **FITS -**
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Furnished With A $\frac{7}{16}$ " Drill & Wrench. Extra Drill - \$2.00

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\$30.00
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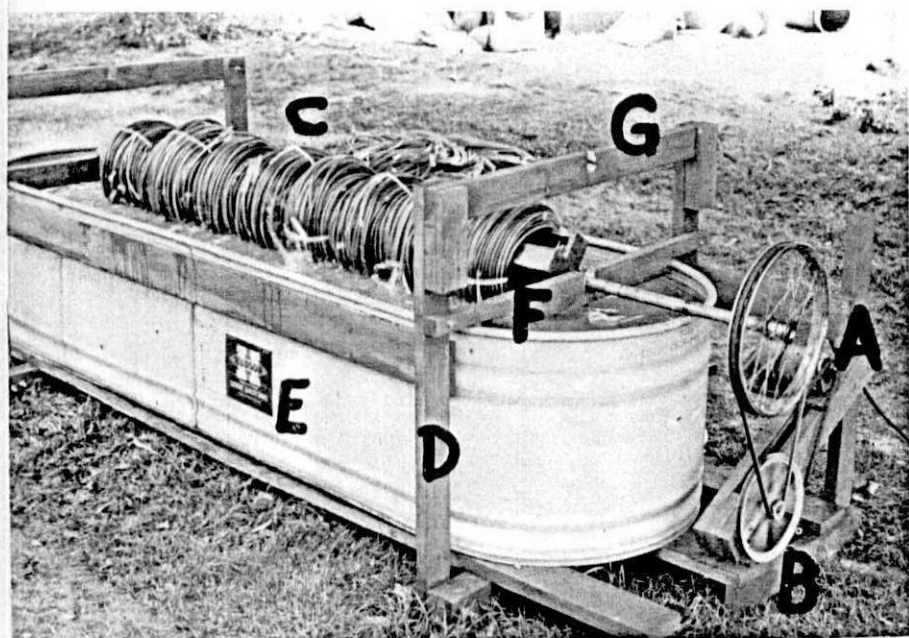
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Please State Model

"SPOOL TYPE" MAPLE SAP



"WASHING UNIT" Photo Courtesy of U.S. Forest Service, Burlington, Vt.

Cleaning up after the boiling season is a big part of the overall sap season. For most maple producers, removing, rolling up and washing tubing lines is a long tiring job.

In previous years, at Heaven Hill, we have disconnected our branch line tubing at each tree, leaving the tees on the drop lines. We then washed the bundles of tubing by jetting a clorox solution through each piece of tubing. We did a

very good job of cleaning, but in doing so, we spent more time washing tubing that could have been spent removing more tubing from the woods.

Many producers, in removing their tubing lines, remove the drop lines, but leave the tees in each line; thus the branch line from first to last tree is removed in one piece. This allows the producer to put the branch line back up the following year very easily with

IMPORTANT NOTICE

It's not right for 20% of the maple syrup producers to support the Digest and 80% ride along free. Please use the enclosed return envelope and enclose your contribution or ask to have your name removed from our list.

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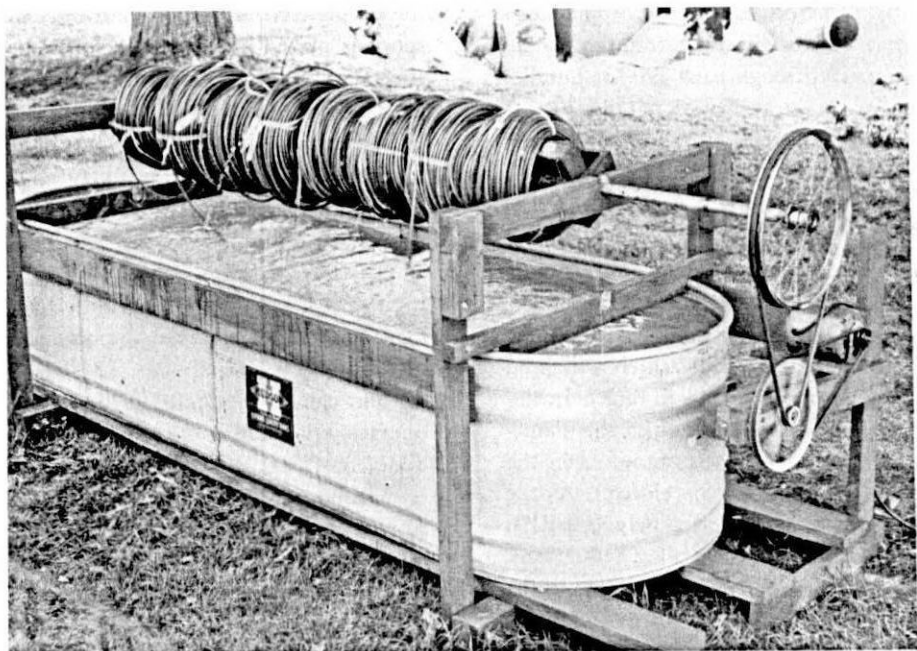
For information write to

WILLIAM L. CHALMER

150 Traverse Blvd., Kenmore, N.Y. 14223

TUBING WASHER

Lewis J. Staats
Heaven Hill Experimental Forest



"WASHING UNIT IN DRYING POSITION"

American Maple Products Corp.

NEWPORT, VERMONT
05855

Has provided producers with a market for their bulk maple syrup for more than 30 years. If you are interested in selling your bulk maple syrup or in acting as a buying agent, please write, or telephone collect, 802-334-6516.

OLD COLONY Brand Maple Sugar and Maple Syrup in bulk and consumer packs is distributed both nationally and internationally.

a system of identification by tagging. In washing this bundle of many feet of tubing with several tees throughout the line, some producers have capped each tee to allow cleaning solution to be pumped through each line or bundle. Other producers have devised a system of washing branch lines teed together without caps. They revolve bundles of tubing slowly in the cleaning solution. In the last 2 years, we too have adopted this method. Our washing unit is simple and inexpensive. It operates as follows.

The bundles or coils of tubing are placed on the spool which will hold 300-400 taps (300 gallon tank). In the washing position, one third the diameter of each bundle is immersed in the cleaning solution (5% clorox). As the bundles are revolved slowly (60 RPM or less due to the pulley reduction), the line ends and open tees pick up the solution which then travels through

the bundles. This constant revolving action with solution entering and leaving the bundles through the tees cleans the tubing. To remove the solution, the spool is placed on the upper supports and revolved again. The solution drains back into the tank.

The time each "batch" of tubing is washed depends on how dirty the tubing is or how particular the operator is. Usually 30 minutes of washing is ample time to thoroughly wash the tubing. Drying or removing the cleaning solution on the upper supports can be done in 20 - 30 minutes. The washing unit can be left unattended while in operation to permit other work to be done.

A simple frame can be constructed to roll up the lines so that all bundles are uniform in size and will slip onto the washing spool with ease. As mentioned previously, the lines should be

SOMETHING NEW AT LAMB'S

Now, a new jug for the tourist trade of Canada — will also be available in the United States — an exact reproduction of an antique molasses pitcher — made of XT Polymer plastic — 2 sizes, 125 or 500 milliliters — will be sold only in limited quantities — not competitive with existing plastic containers — so new we can't even show you a picture — should be ready for the 1973 season.

R. M. LAMB BOX 278
LIVERPOOL, N. Y. 13088

tagged. A small piece of aluminum wired to the first tee works well as a tag.

The Washing Unit (see photo) consists of:

A. 1/4 or 1/3 H.P. 1725 RPM Electric motor.

B. Reducing pulley. The one in photo is double pulley removed from a discarded clothes dryer. Motor and reducing pulley are mounted on a piece of 2 x 4 lumber. One bolt holds this arm to the upright to allow for dual position of washing and drying and to keep tension on the pulleys.

C. Spool on which bundles are placed. Spool is made from 1" x 2" lumber with the axle of 1" galvanized pipe. Pulley in photo is 20" bicycle wheel but any large pulley will suffice.

D. All framework is made from 2 x 4 lumber.

E. Washing tank - a 300 gallon tank is used at Heaven Hill, but washing unit can be built to fit what is available. Tank should be painted or lined with plastic sheeting to combat clo-rox deteriorating the tank.

F. Cleaning level - 2 x 4 supports notched for spool axle and bolted to uprights.

G. Drying level - same construction as cleaning level with one exception. 2 x 4 support closest to motor should be bolted on one end only. The unbolted end can be raised to allow spool to be removed from cleaning level.

Photos courtesy of U.S. Forest Service, Burlington, Vermont.

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GREETINGS FROM WISCONSIN

I look forward each year to this annual meeting - this meeting with fellow syrup makers and the beautiful locations - the wonderful hosting of the ever changing states. Our Wisconsin delegation this year includes John Polak, our Wisconsin Maple Council President and his wife, my son Juan and his wife, our Extension Forester, Ted Peterson and my wife and I, so together we bring you - "Greetings from Wisconsin." Another couple, Mr. and Mrs. Henry Schroeder whom most of you know, had planned to be here, but adverse weather conditions delayed their potato harvest and prevented their coming. They have enjoyed meeting all of you and also send their best wishes.

Reporting on Wisconsin 1972 Maple Syrup Production is a disappointing story, a sort of continued story from the last couple of years. Spotty locations throughout the state fared quite well, especially the very southern areas, but in general we could only boast of half a normal crop.

Snow depth at tapping date was unusually high and though it made tapping a snow shoe job, and difficult, it gave an optimistic feeling among the syrup makers. We were going to have a good sap season. But nobody remembered to slip the weather man a few bucks to arrange for freezing nights, and that snow disappeared and so did our sap season.

And that's where it's nice to have friends like you people in other states, where you are a little smarter and know how to manage for a better sap flow.

The 1972 season following the ex-

treme shortage of '71 had a waiting demand or market, so we were welcoming syrup to supplement our short supply and were offered syrup from many areas represented at this meeting. Your sharing your crop with Wisconsin made it possible to supply the midwest with a fairly good inventory. We appreciate this very much, but it is only fair to point out that there is little hope of our being in a position to return the favor, as our production continues to decline while demand increases each year. So in concluding my report, I would hope that Wisconsin can depend on continued future supply of syrup from your areas.

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AN ECONOMICAL ULTRAVIOLET-IRRADIATION UNIT FOR PASTEURIZING FLOWING MAPLE SAP

by J. C. Kissinger and R. A. Bell

The following is a condensation of the A. R. S. report carrying the above title. The complete paper, including results of experimentation, may be obtained by writing to:

Dr. John Kissinger
East. Util. Res. Br., USDA
600 E. Mermaid Lane
Philadelphia, Pa. 19118

Editor

Germicidal ultraviolet (U.V.) lights have been used by maple producers primarily for the control of microbial growth in stored sap during periods when profuse sap flows exceed an evaporator plant's sirup-processing capacity. Since the lethal U.V. rays do not penetrate deeply into statically stored maple sap, sap storage for periods up to 5 days can be carried out only by using agitation to renew the

surface of the sap exposed to U. V. irradiation. However, in cases requiring less than 48 hours storage, the sap usually can be safely held by passing it through an in-line ultraviolet irradiation unit of the type used to sanitize home water supplies. Since the surviving bacteria multiply at a rate controlled by the sap temperature, it is possible that, in abnormally warm weather, degradation could take place in even less than 48 hours after pasteurization.

One of the major deterrents to the use of in-line U.V. irradiation units in the maple industry has been their cost. A commercial in-line U.V. irradiation unit suitable for a small maple evaporator plant costs in excess of \$500.00. Because of this, the in-line U.V. irradiation unit has not been used by many maple sirup producers. But the concept of using U.V. irradiation to pasteurize

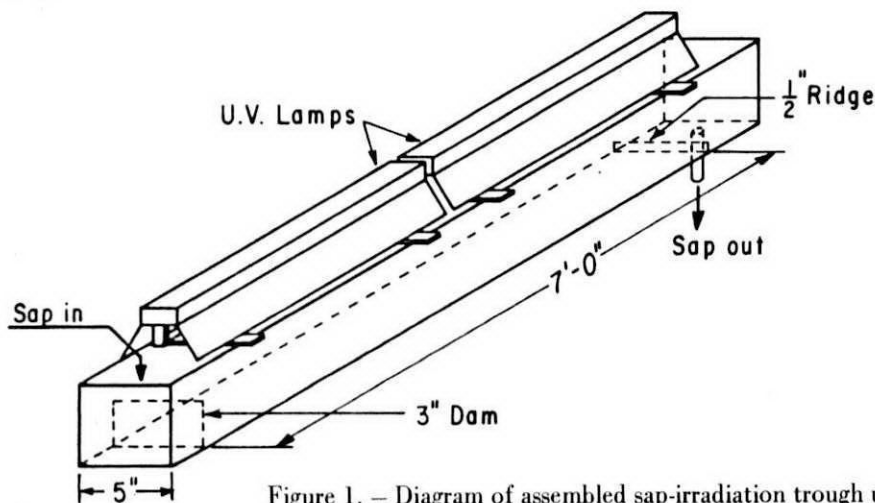


Figure 1. — Diagram of assembled sap-irradiation trough unit.

flowing maple sap is technically sound, and an inexpensive U. V. unit capable of performing this function could be of value to the small maple producer. This paper describes the construction and operational characteristics of an economical basic U.V. unit, which the maple producer can assemble or fabricate from readily available materials.

MATERIALS USED

Pump — A centrifugal pump producing flow rates up to 9 gallons per minute (g.p.m.) through the irradiation troughs.

Control valve — A gate valve in the pump discharge line to control flow rates.

Flow meter — A Fischer and Porter Flowrator, calibrated in 0.2 g.p.m. increments from 0 to 12 g.p.m., was used to measure flow rates. (Note: Trade names are used in this publication solely for the purpose of providing specific information. Mention of a trade or company name does not constitute

a guarantee or warranty of the product by the U.S. Department of Agriculture or an endorsement by the Department over other products not mentioned.)

Irradiation troughs — Two irradiation troughs were constructed of dull-finish stainless steel with dimensions identical to those of commercially available 5-inch box-type guttering. (fig. 1)

A 3-inch sheet-metal dam was placed at the feed end of each trough to create a well for the sap. Splashing and foaming was minimized by feeding sap into the well below the surface of the contained sap, and the even flow of sap over the dam eliminated cavitation of the sap-flow pattern through the irradiation area. A ½-inch ridge of sheet metal was emplaced 7 feet downstream from the dam, directly before the sap-outlet line. This maintained the sap at a depth of ½ inch in the irradiation area and helped provide turbulent flow through the trough.

Ultraviolet lamps — Two single-tube

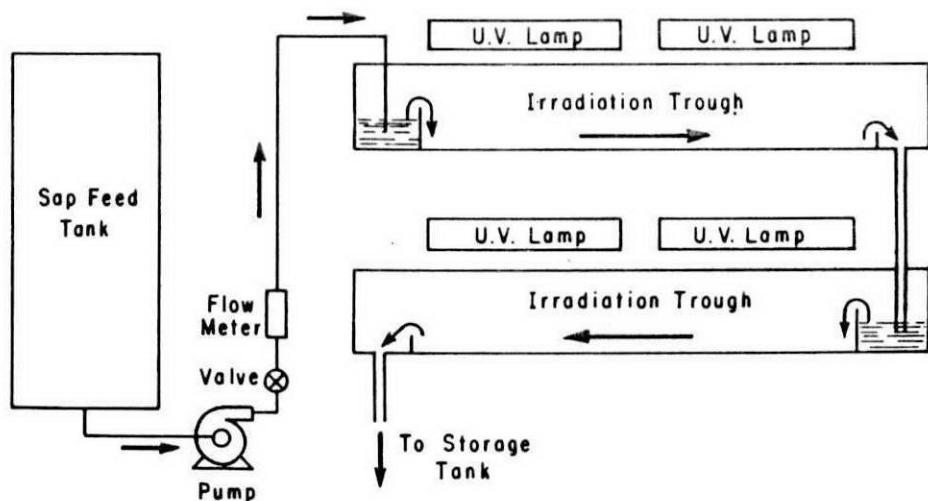


Figure 2. — Flow diagram of sap-irradiation trough system.

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fluorescent lamp fixtures with white enameled reflectors were mounted in series directly above the irradiation area of each trough. The fixtures were fitted with General Electric G30T8 ultraviolet light tubes. The lights were placed on the top of the trough to minimize splashing of sap on the light tubes. Splashing and subsequent drying of sap on the lamp tubes would have drastically decreased the intensity of U.V. rays emitted by the lights. Sheets of aluminum-foil wrap were placed over the lights to shield the operator's eyes from the U.V. rays when the unit was in operation.

Irradiation system — A flow diagram of the irradiation system is shown in figure 2. The inoculated simulated sap was pumped from the sap-feed tank and successively passed through the flow-control valve, flow meter, and irradiation troughs, and then it was discharged.

RESULTS AND DISCUSSION

An irradiation trough is, admittedly, a crude device, but the efficiency of this unit compares favorably with that of the in-line U. V. units that were used in previous studies of irradiation pasteurization in this laboratory. Exposure of sap to U. V. rays for 7.8 seconds during its flow through the trough unit resulted in a decrease of more than 95 percent of the sap-bacterial population. Similar results were obtained by passage of sap containing comparable microbial popula-

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tions through commercial in-line irradiation units with a 7-second exposure time. As could be expected, the commercial unit was somewhat superior to the trough unit as a sap pasteurizer, but the trough unit is quite capable of meeting the need of the average maple sirup producer for a method of storing sap for periods as long as 48 hours.

Sap that was treated by passage through the trough pasteurizer had storage stability similar to that of sap passed through a commercial in-line irradiation unit. Storage of the treated sap at 65° F. for 48 hours resulted in bacterial growth that restored the bacterial population to pre-pasteurization levels. Therefore, the maple producer must regard U. V. irradiation pasteurization as only a temporary measure, permitting storage of sap for periods as long as 48 hours. It should be further noted that the 48-hour storage time can be valid only for sap stored in a carefully cleaned and sanitized tank. Storage of pasteurized sap in an unclean tank can result in immediate massive contamination and rapid deterioration of the sap, without regard to its sanitary quality at the time of storage.

COST OF MATERIALS

2 White enameled gutter troughs (sold in 10-foot lengths)	\$ 8.00
4 End caps for gutter troughs	1.20
2 Drop outlets for gutter trough	2.60
4 Fluorescent light fixtures, 36 inches long, single tube with white enameled reflector . . .	68.00
4 Ultraviolet lamp tubes G30T8	36.00
Estimated cost	<u>\$115.80</u>

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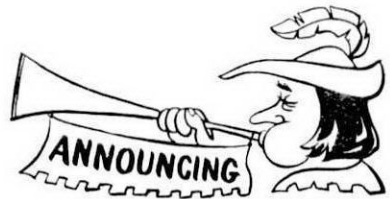
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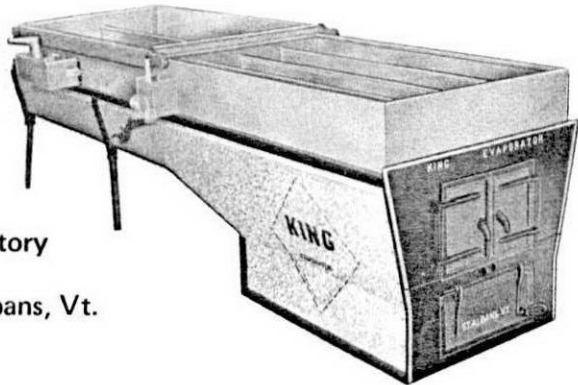
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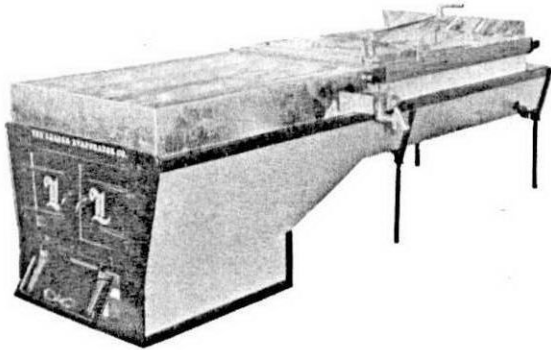
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