DEBARKERS USED IN THE SOUTH AND EAST

Information Reviewed and Reaffirmed

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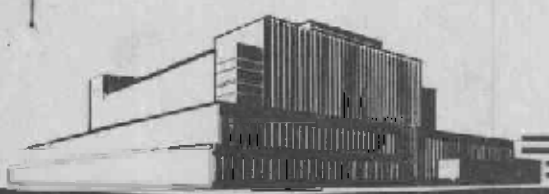

FOREST PRODUCTS LABORATORY
MADISON 5, WISCONSIN

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
In Cooperation with the University of Wisconsin

DEBARKERS USED IN THE SOUTH AND EAST[1]

Forest Products Laboratory,[2] Forest Service
U.S. Department of Agriculture

Mechanical debarkers for both sawmill logs and pulpwood are increasingly being used in the United States. This report has been prepared to answer the many inquiries received at the Forest Products Laboratory for descriptive information and operating data on several of the debarkers that are in use or available in the South and East. The information here reported is largely obtained from observing the debarkers in operation, interviewing men in the plants where the machines have been installed, or talking with manufacturers of the units, and does not profess to cover all debarkers currently in operation. Trade names are used in this report since debarkers are a comparatively new tool for the forest products industries. The mention of any debarker by trade name, however, does not constitute an endorsement of the product by the Forest Products Laboratory.

The following saw log debarkers are covered in this report: Andersson, Hurricane, Nicholson Rotobarker, and the Soderhamn D-3. Pulpwood debarkers included are the Augustin, Burnt River, Cambio, Carpenter, Crouse, Hurricane, and the Impco. The only slab debarker included is the Jackson Industries Hydraulic slab debarker. The Burnt River, Cambio, Hurricane, and Carpenter debarkers were not observed and the information quoted was largely from manufacturers or trade magazine articles.

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[1]Report originally written in September 1955 by R. H. P. Miller, former Forest Products Laboratory engineer.

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

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Anyone interested in a particular debarker should write to the manufacturer, because none of these units is built on a large production basis so that changes, modifications, and improvements may have been made in more recent units. The cost of the units is also subject to change.

General figures of capacity per eight hours for the different debarkers are given. The capacity will, of course, vary with the size of the log or bolt, species, and peeling condition of the log.

SAWLOG DEBARKERS

The number of medium and large mills in the South and in the West that are debarking their logs, chipping the bark-free waste, and selling the chips to pulp mills is definitely increasing. Both the lumber and the pulp industries are now showing a marked interest in this utilization opportunity. One pine mill in the East is debarking its logs, and the bark-free waste is used for producing wood flour. One eastern company is also debarking pulpwood logs.

This discussion of sawlog debarkers is limited to mechanical debarkers that can be operated at a profit for mills cutting less than 150M board feet per 8-hour day. The hydraulic barkers used on the West Coast and in one very large mill in the South are not economically feasible for mills of the size mentioned. Barkers, like the Ormell, are not included even though the one southern installation made years ago is still operating. No new installation of this type, however, has been made in recent years.

The total cost of installing a debarker is not given in this report because the cost varies largely with the setup required at different plants due to the layout at the plant. The debarkers are usually housed near the log haulup. Usually it is necessary to build (1) a conveyor system to and from the log haul to the debarker, (2) log deck at the debarker, and (3) a bark refuse chain to the main refuse conveyor.

The sawmill debarkers are operated by one man, but one or two additional men are usually required to handle the logs to and from the debarker. At some mills they were charging part of the millwright's crew and log yard crew against debarking, even if the size of these crews had not been increased with the installation of the barker.

No figures on the cost of debarking logs are given in this report. In the majority of cases the units have not been operating long enough to get good cost figures. At first the maintenance and breakdown costs were generally high due to modification made in the units and also due to the inexperience of the operators. The sawmill operators believe that debarking is not only profitable due to selling bark-free chips but also due to the increased recovery, better grades of lumber, and lower saw maintenance.

Andersson Debarker

Made by the Soderhamn Machine Manufacturing Co., Talladega, Ala.

The Andersson debarker is of the pressure-cambium-shearing type, and is built in 26-inch, 20-inch, and 16-inch diameter sizes. In these machines the logs pass through a rotating ring. On the 26-inch machine, eight round-edge tools are pressed against the log pneumatically as the tools rotate around the log. The pressure is sufficient to break down the cambium so that the bark shears off of the wood. The tools follow the contour of the log, and, due to the sloping edges, can ride over short limb stubs and other irregularities. The two horizontal feed rollers and the two vertical guide rollers on both the infeed and the outfeed ends of the machine are operated pneumatically. These rollers center the logs in the ring, prevent the logs from turning, and feed the logs through the unit.

The operator must close down the tools on the log just after they have entered the ring; otherwise, a collar of bark is left on the front end of the log. If the logs are butted against each other and are about the same diameter, the adjustment of the barking tools and rollers is automatic. The operator controls the feed rate, opening and closing of the tools, guide and feed rollers. All these operations are performed by air or electrical controls that are easily operated from a convenient panel.

General information on the Andersson 26-inch debarker

Log diameters	5 to 26 inches
Log lengths	Minimum 8 feet
Feed rate	45 to 90 f. p. m.
Capacity	100M per 8 hours
Power required	3 motors totalling 75 horsepower
Approximate cost	$34, 000 f. o. b. Talladega, Ala.

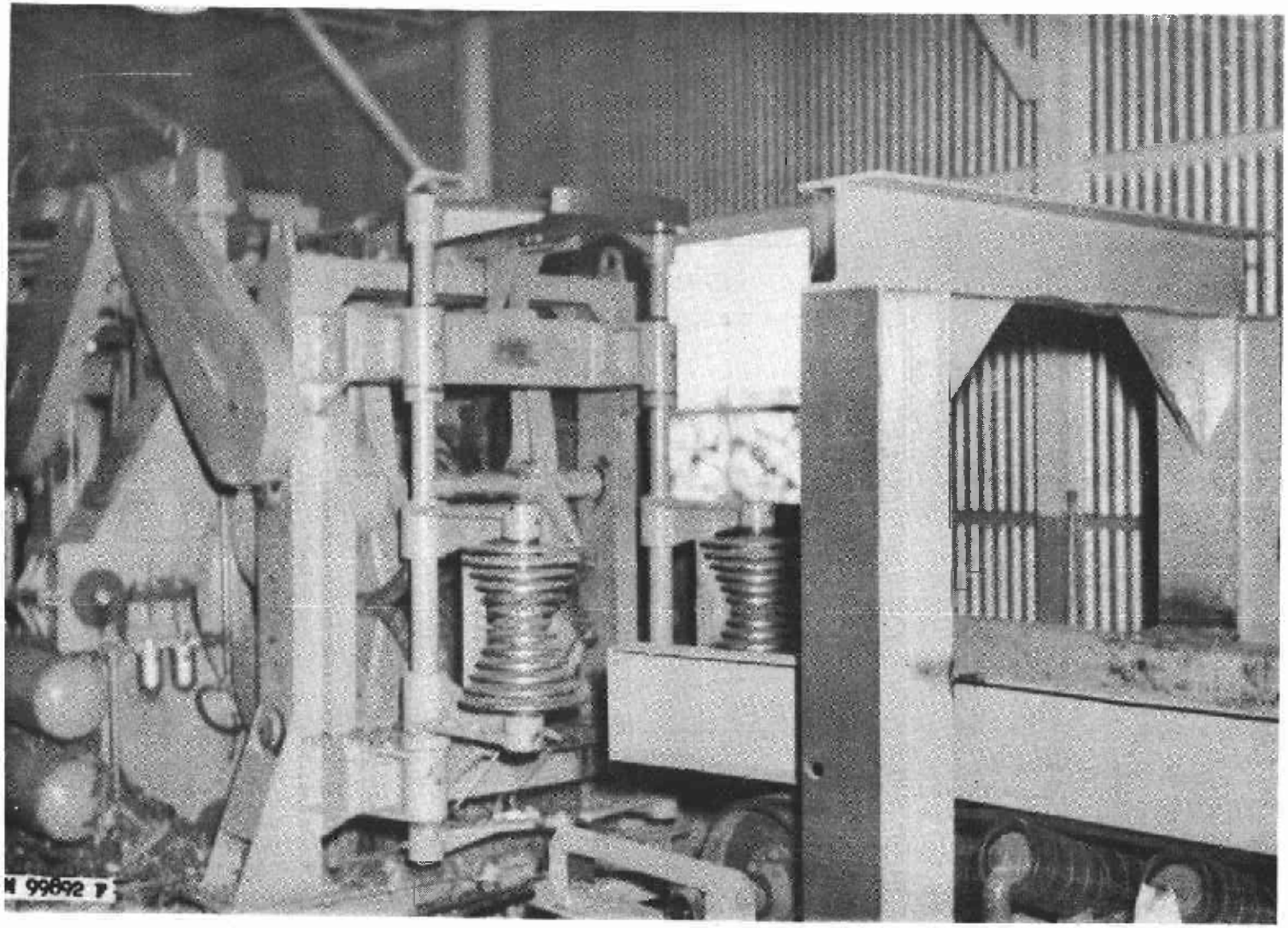

Figure 1. --Side view of the Andersson debarker.

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Partial list of southern and eastern installations

Barksdale Lumber Co., Amity, Ark.
Bearden Lumber Co., Bearden, Ark.
Champion International Co., Concord, N. H.
Clancy Lumber Co., Grayson, Ala.
H. D. Foote Lumber Co., Alexandria, La.
Fordyce Lumber Co., Fordyce, Ark.
W. S. Fox & Son Lumber Co., Pine Bluff, Ark.
Gurdon Lumber Co., Gurdon, Ark.
Charles Ingram Lumber Co., Florence, S. C.
Sabine Lumber Co., Zwolle, La.
W. T. Smith Lumber Co., Chapman, Ala.
Southern Lumber Co., Warren, Ark.
Springhill Lumber Co., Springhill, La.
Urania Lumber Co., Urania, La.
Urbana Lumber Co., Urbana, Ark.
Woodward-Walker Lumber Co., Taylor, La., and Heflin, Ark.

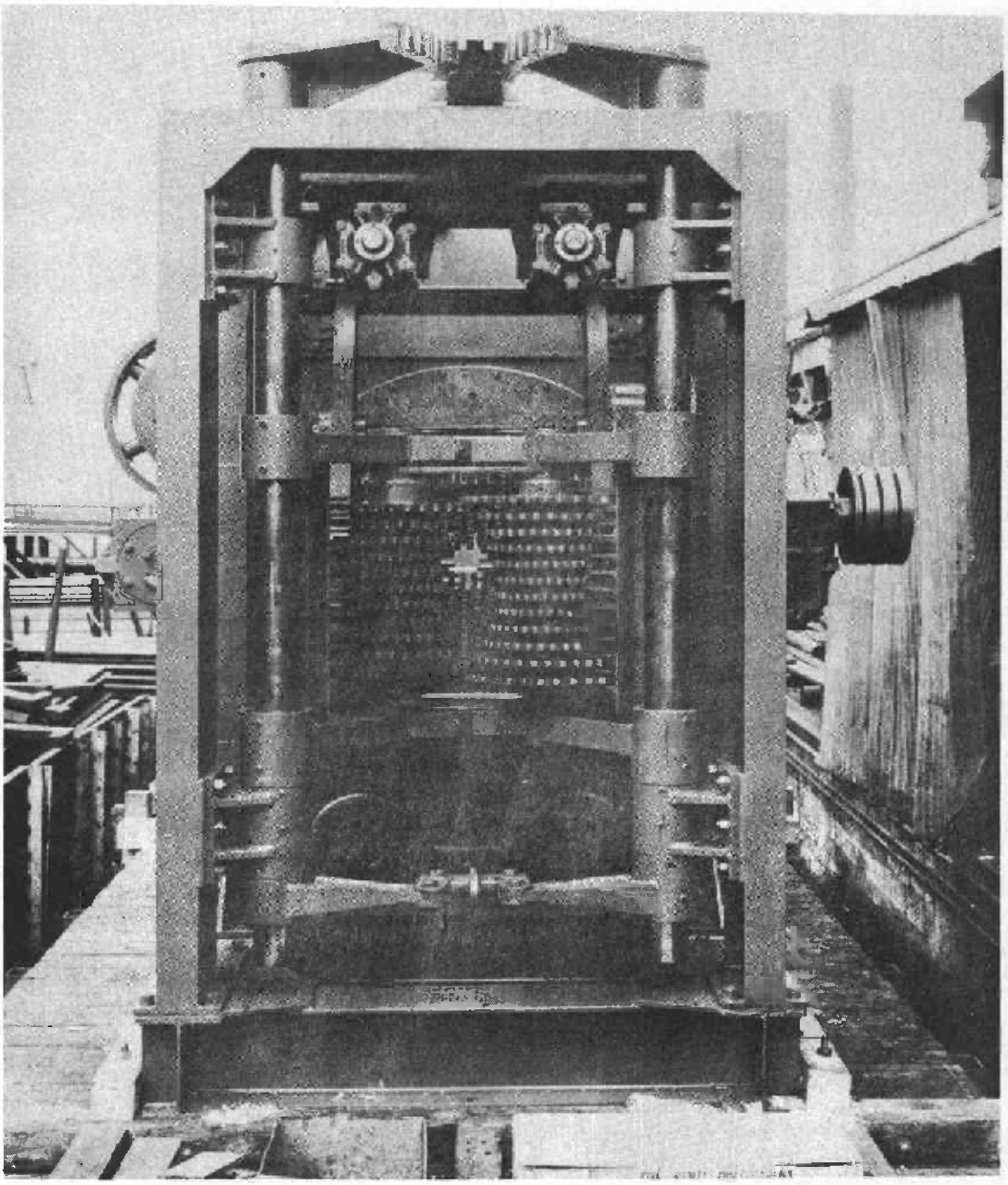

Figure 2. --End view of Andersson debarker showing guide roller and a part of the linkage to center logs.

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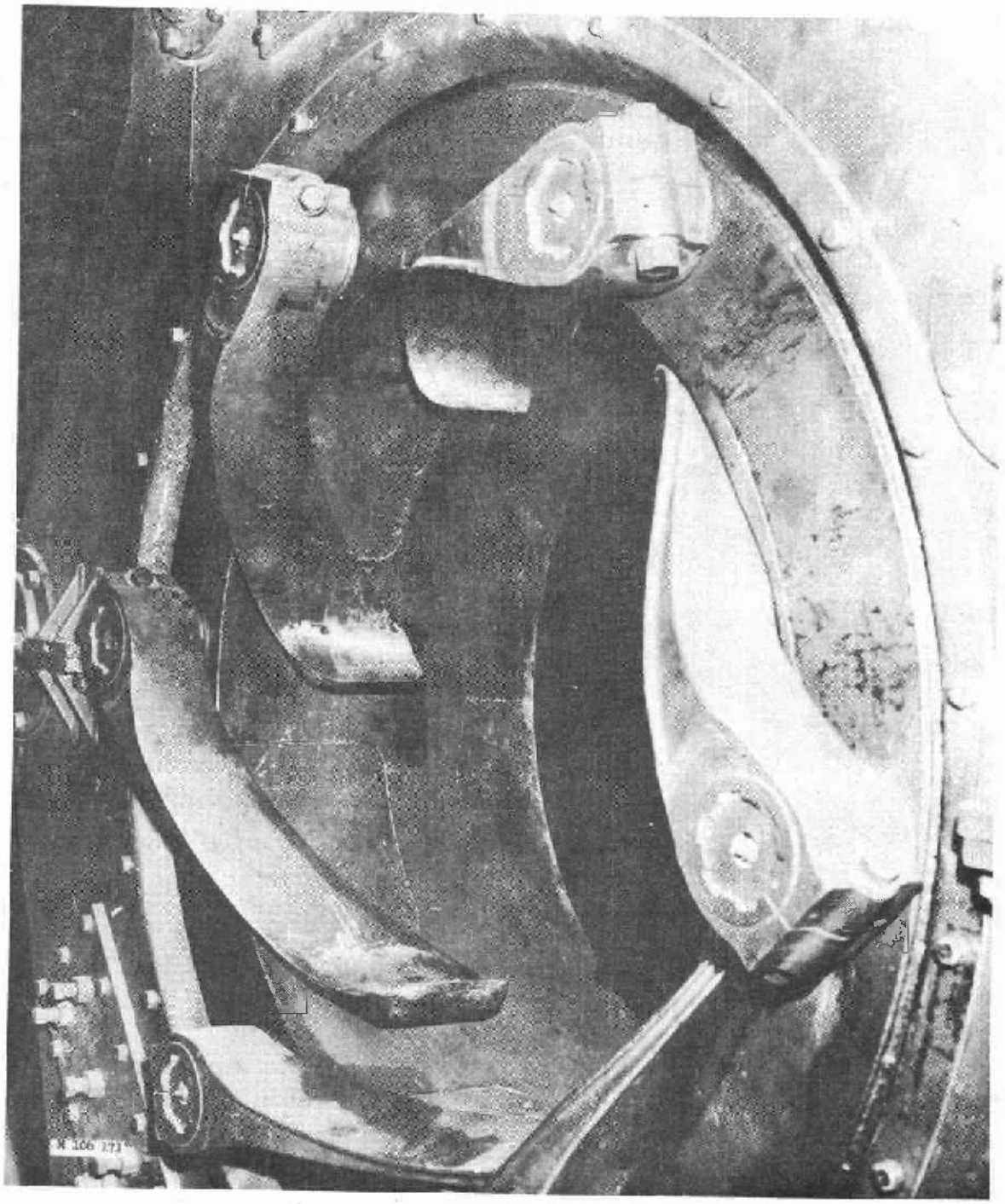

Figure 3. --Barking ring with pivot arm tools. The Andersson debarker can be furnished with straight or pivoted tool arms.

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Nicholson Rotobarker

Made by the Nicholson Manufacturing Co., 5416 - 14th St., N. W., Seattle, Wash.

The Nicholson Rotobarker is a pressure-cambium-shearing type of saw-log debarker, and is built in 30-inch, 40-inch, 50-inch and 60-inch diameter sizes. The log passes through a rotating ring with four round-edged tools on the 30-inch machine that are pressed against the log as they revolve around the log. These tools are mounted on lever arms that are pivoted on the revolving ring, and the arms are pushed down pneumatically closing the tools centerwise. The tools follow the contour of the log, and, due to the sloping edges on the tools, they can ride over short limb stubs and other irregularities. The logs are fed through the machine on a spurred chain. Four fluted rollers on pivoted arms on both the infeed and the outfeed end pneumatically press the logs against the feed chain and also prevent the logs from turning. In the Nicholson Rotobarker the entire rotary ring assembly is raised or lowered hydraulically to center the log.

The operator must close down the tools on the logs just after they enter the ring; otherwise, a collar of bark is left on the front end of the log. The operator controls the feed rate, pressure exerted by the tools, centering of the logs, opening and closing of the tools, and guide rollers from a convenient panel.

General information on the 30-inch Nicholson Rotobarker

Log diameter	5 to 30 inches
Log lengths	Minimum 8 feet
Feed rate	25 to 100 f. p. m.
Capacity	150M
Power required	80 horsepower
Approximate cost	$39,000 f. o. b. Seattle

Partial list of southern installations of the Nicholson Rotobarker

Angelina Lumber Co., Keltys, Texas
W. A. Belcher Lumber Co., Birmingham, Ala.
Cogle Lumber Co., Thomasville, Ala.
Crossett Lumber Co., Crossett, Ark.
Southern Pine Lumber Co., Diboll, Texas

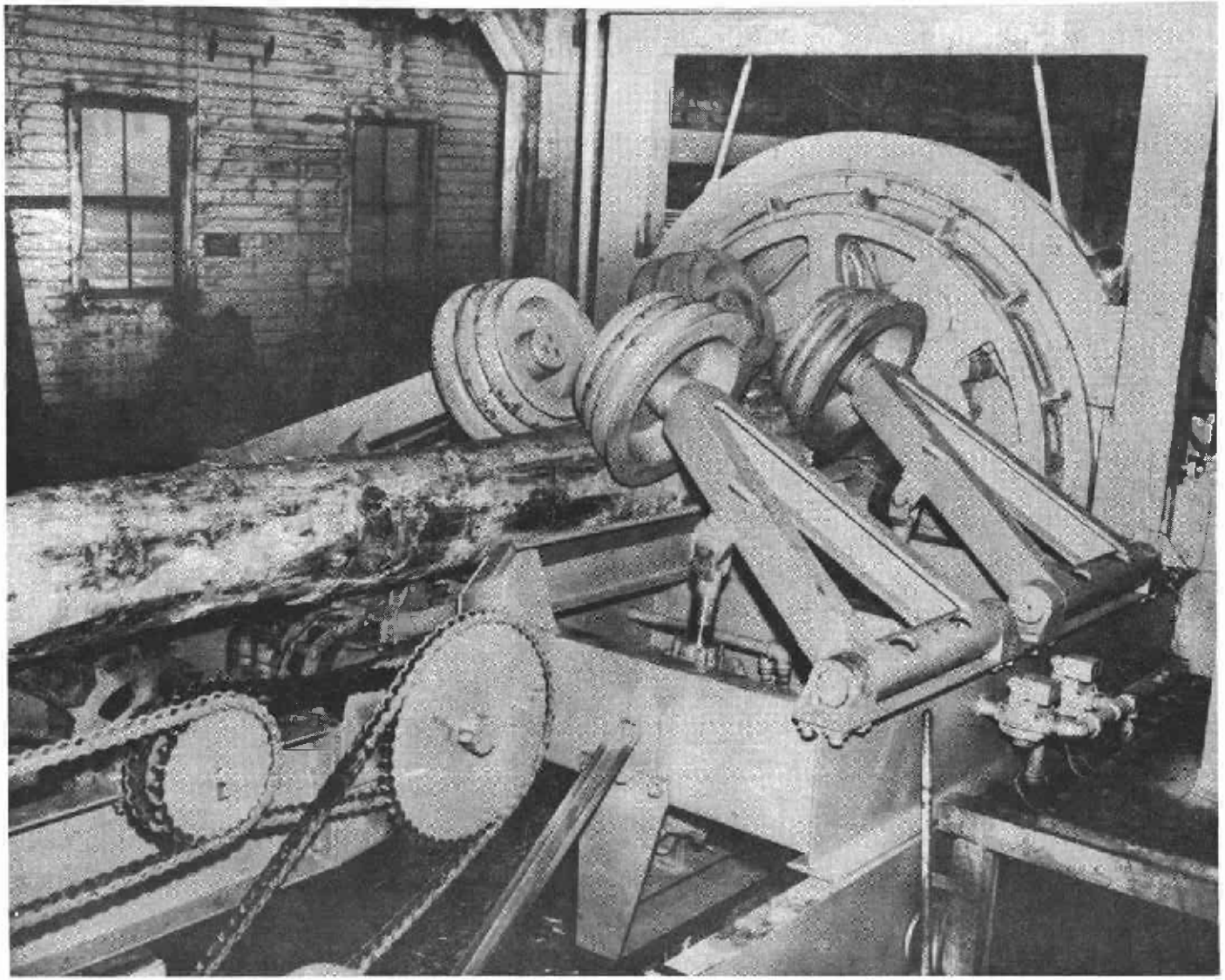

Figure 4. --Outfeed end of the Nicholson Rotobarker, showing holddown rollers and barking ring.

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Figure 5. --Logs debarked by the Nicholson Rotobarker.

Soderhamn D-3 debarker

Made by the Soderhamn Machine Manufacturing Co., Talladega, Ala.

The D-3 sawlog debarker is a mechanical impact, or hammer type, machine. Short chains with one end fastened to the chain head that revolves at about 1,000 r. p. m. beat or flay off the bark. The D-3 can be purchased either with electric or gasoline motor drive.

The logs are cradled on three pairs of fluted spheres that rotate the logs as the chain head travels from one end of the log to the other. The axes of these spheres can be swung around so that they can feed the log through the barker before and after debarking.

The chain head is raised and lowered hydraulically so that the head stops rest on the log. The head supports are pivoted so that the head can follow the contour of the logs. The operator controls the rate of travel of the chain head through a hydraulic motor.

General information on the D-3 debarker

Log diameters	5 to 36 inches
Log lengths	Minimum 10 feet
Feed rate of chain head	Maximum 50 f. p. m.
Capacity	40 M per 8 hours
Power required	One 15 h. p., one 10 h. p., and one 3 h. p., motor, totalling 28 h. p.
Approximate cost	$14,000 f. o. b. manufacturing plant

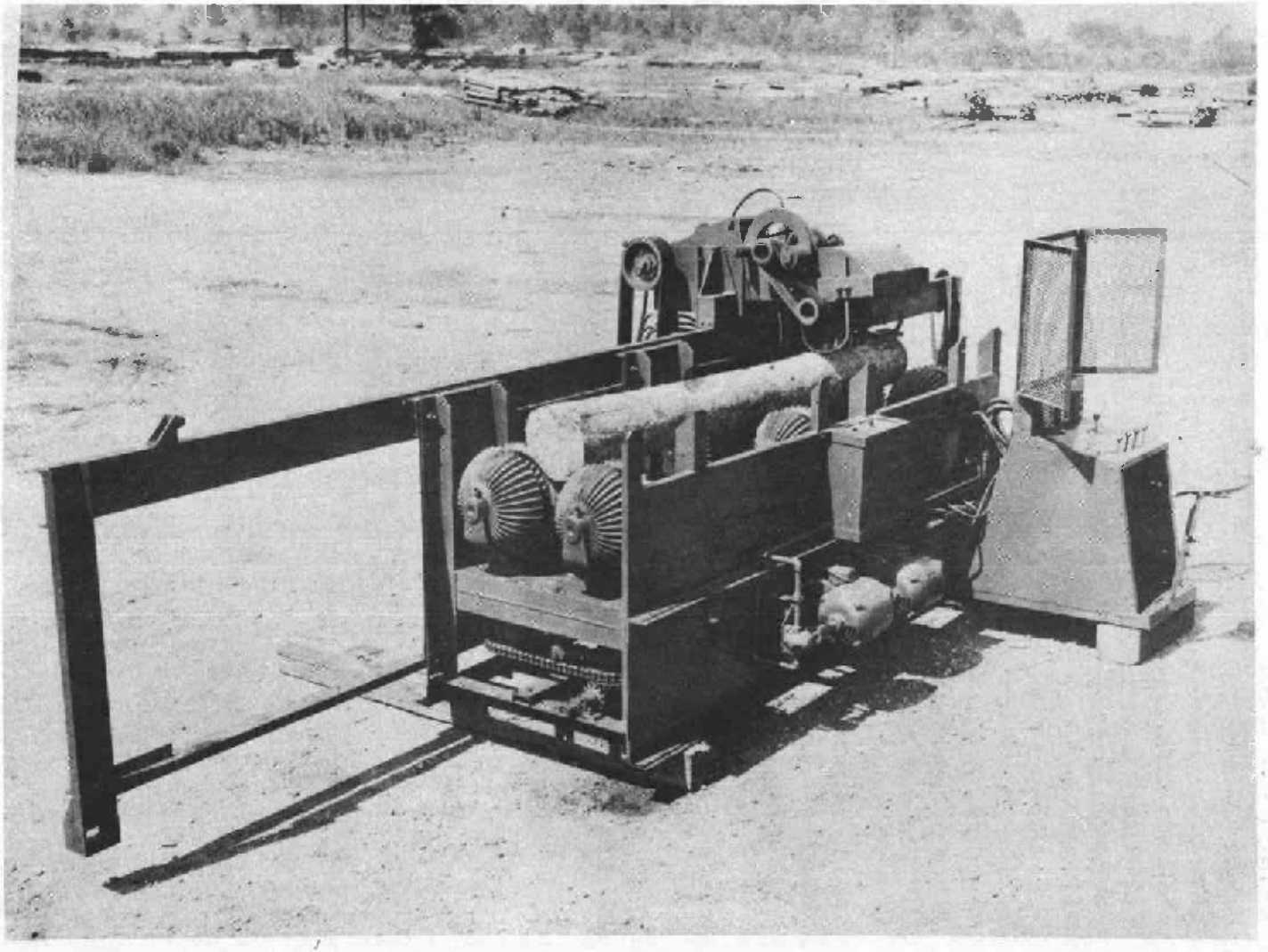

Figure 6. --Soderhamn D-3 debarker.

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Partial list of southern and eastern installations of the D-3 debarker

Barrow Manufacturing Co., Ahoskie, N. C.
Bradley Plywood Corp., Savannah, Ga.
Darby Lumber Co., Statesboro, Ga.
Dargan Lumber Co., Conway, S. C.
Emporia Manufacturing Co., Emporia, Va.
John Evans Lumber Co., Nashville, N. H.
Freeman Lumber Co., Ahoskie, N. C.
Gray Lumber Co., Waverly, Va.
Hunt Lumber Co., Ruston, La.
Jackson Sawmill Co., Jackson, Ala.
Reynolds-Draper Lumber Co., El Dorado, Ark.
Reynolds-Manley Lumber Co., Savannah, Ga.
Tutt Lumber Co., Nanafalia, Ala.
H. M. Walker Lumber Co., Battleboro, N. C.
Wilner Wood Products Co., Norway, Maine
Herman Wilson Lumber Co., Leola, Ark.

Hurricane sawlog debarker

Sold by Wood Treating Chemical Co., 5137 Southwest Ave., St. Louis 10, Mo.

The Hurricane sawlog debarker is a floating cutterhead type developed from pole peeling machines. One advantage of the knife-type debarkers is that the logs can be barked at about the same rate at all seasons of the year, for the milling off of the bark is not affected by different degrees of adhesion of the bark. Another advantage is that it smooths up the log by cutting off knots, limb stubs, bumps, etc., making it easier to handle and dog the logs. One disadvantage, however, is that the wood loss is greater with knife debarkers than with other types of debarkers.

The cutterhead is mounted on arms pivoted on the frame of the machine so that the head can swing up or down for different diameter logs. The depth of the cut is adjusted by raising or lowering the shoes on each end of the head. These shoes ride on the surface of the log, and, therefore, the cutterhead follows the surface of the log. The logs are cradled on a series of wheels that rotate and move the logs through the barker. The operator can control the speed of rotation and the rate of feed through the machine. The rate of feed is varied by changing the angle of the axis of the wheels. The machine is operated by hydraulic controls. The barker comes complete with roller conveyors, log kickers, hydraulic pump, electric motor, and refuse conveyor so that the machine is complete and ready to install.

General information on the Hurricane sawlog debarker

Log diameters	5 to 30 inches
Log lengths	8 feet and over
Capacity	65M per 8 hours for logs averaging 12 inches in diameter
Power required	60 horsepower
Approximate cost	$25,000 f.o.b. manufacturing plant

Partial list of southern installations

Gordon Fulcher, Crossville, Tenn.
Knox Lumber Co., Soperton Ga.
Roundtree-Hunter Lumber Co., Fitzgerald, Ga.
Wade Lumber Co., Folkston, Ga.

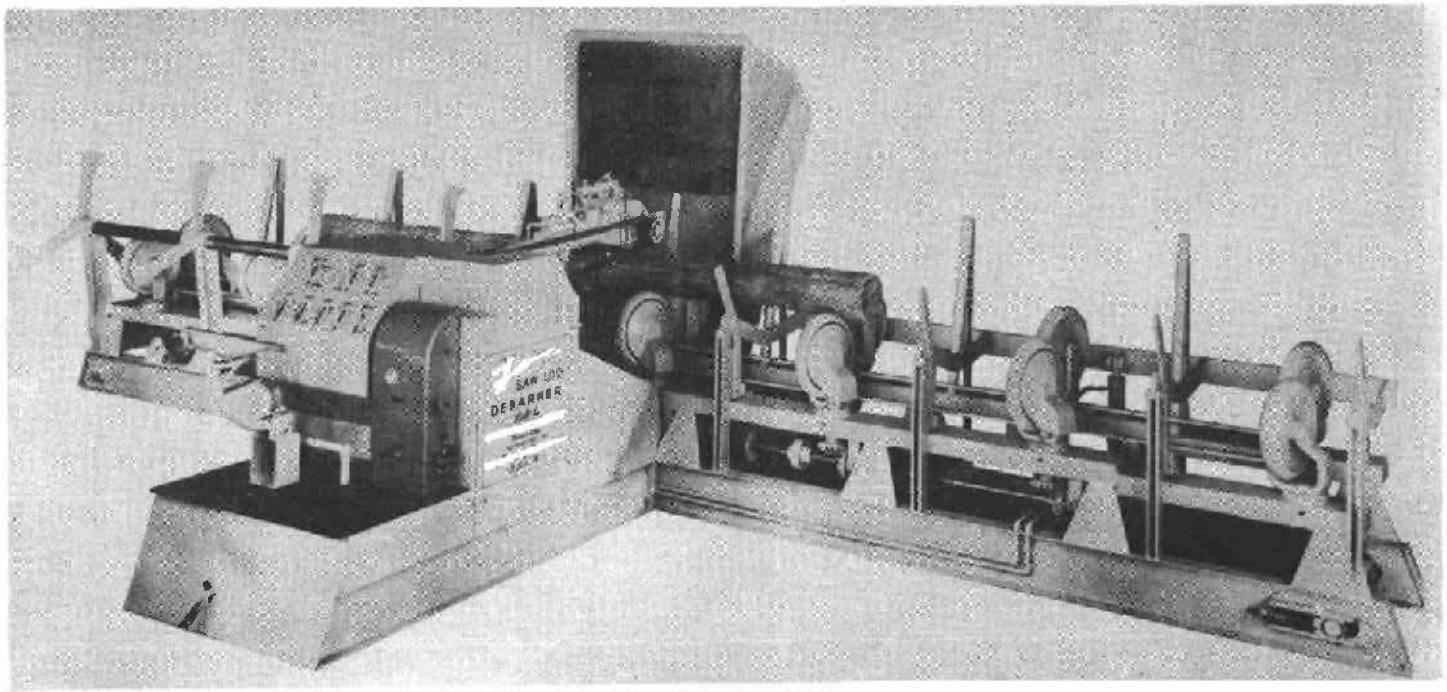

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Figure 6A. --Hurricane sawlog debarker.

PULPWOOD BOLT DEBARKERS

Pulpwood bolt debarkers, especially of the pressure-cambium-shearing type have been developed in the last few years. The units include some of the pressure-cambium shearing type, impact or hammer type, and the cutterhead type of debarkers that are available on the market at the present time suitable for pulpwood operators. Large drum or hydraulic debarkers used at pulp mills are not included.

Impco Debarker

Made by the Improvement Engineering Company, Nashua, N. H.

The Impco debarker is of the pressure-cambium-shearing type, and was designed for pulpwood bolts. The debarker is built in stationary or in portable types of units for 4-foot and 5-foot wood, and also for 100-inch wood. Six spring-loaded tool arms are pivot-mounted on a revolving ring through which the bolts pass. The tool tips are fairly sharp, and scrape off the bark in spiral ribbons. The sloping front and side edges of the tool and arm automatically open the circle of tools as they come in contact with the bolts, and make the tools ride over stubs and other irregularities. With this unit a space must be left between the ends of the bolts; otherwise, if a small bolt is followed by a larger one, the tools will open and not debark the end of the small log. The infeed conveyor chain has shoulder lugs spaced about 6-1/2 feet apart for handling 4-foot bolts. The next section of the infeed has bottom-driven spur rollers and top idler roller that feed and prevent the bolts from turning. Both the infeed and outfeed ends of the debarker have two jaws about 120 degrees apart that force the bolts against the feed rollers. Four heavy springs create the pressure exerted by these jaws. The jaws with their sloping front edge and a lever system center the bolts in the ring. Since the machine automatically centers the bolts, opens and closes the tools, the operator devotes practically all his time to feeding the bolts on the infeed chain.

General information on the Impco debarker

Bolt diameters	4 to 16 inches
Bolt lengths	Machines built for 4-foot and 5-foot, or 100-inch bolts
Feed rate	30 to 120 f. p. m.
Power required	32 horsepower

Partial list of Impco debarker installations

Central Paper Co., Muskegon, Mich.
Eastern Corporation, Lincoln, Maine
Waldorf Co., St. Paul, Minn.

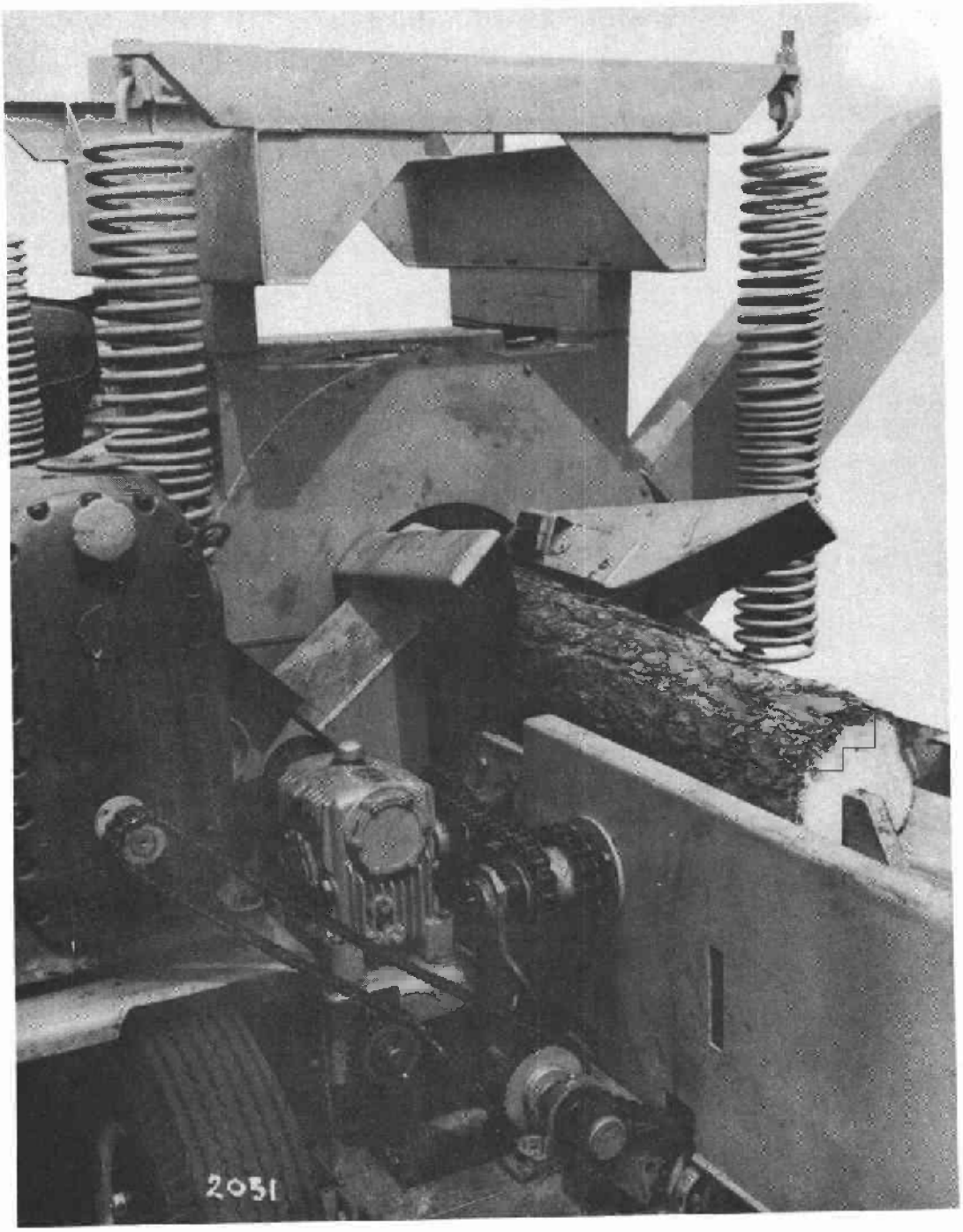

Figure 7. --Infeed end of Impco debarker.

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Cambio Debarker

Made by the Soderhamn Machine Manufacturing Co., Talladega, Ala.

The Cambio debarker is of the pressure-cambium-shearing type of pulpwood debarker. On both the infeed and the outfeed sides of the barking ring three knurled feed rollers forming a triangular opening also automatically center the bolts and prevent them from turning. This barker is fully automatic in that the bolts are centered and the tools are self-opening. This machine is now available in this country.

General information on the Cambio 35 Debarker

Bolt diameters	2 to 14 inches
Bolt lengths	3 feet and over
Feed rate	100 to 150 f. p. m.
Capacity	8 cords per hour. Will vary with bolt diameters.
Power required	20 horsepower
Approximate cost	$17,000 f. o. b., Birmingham, Ala.

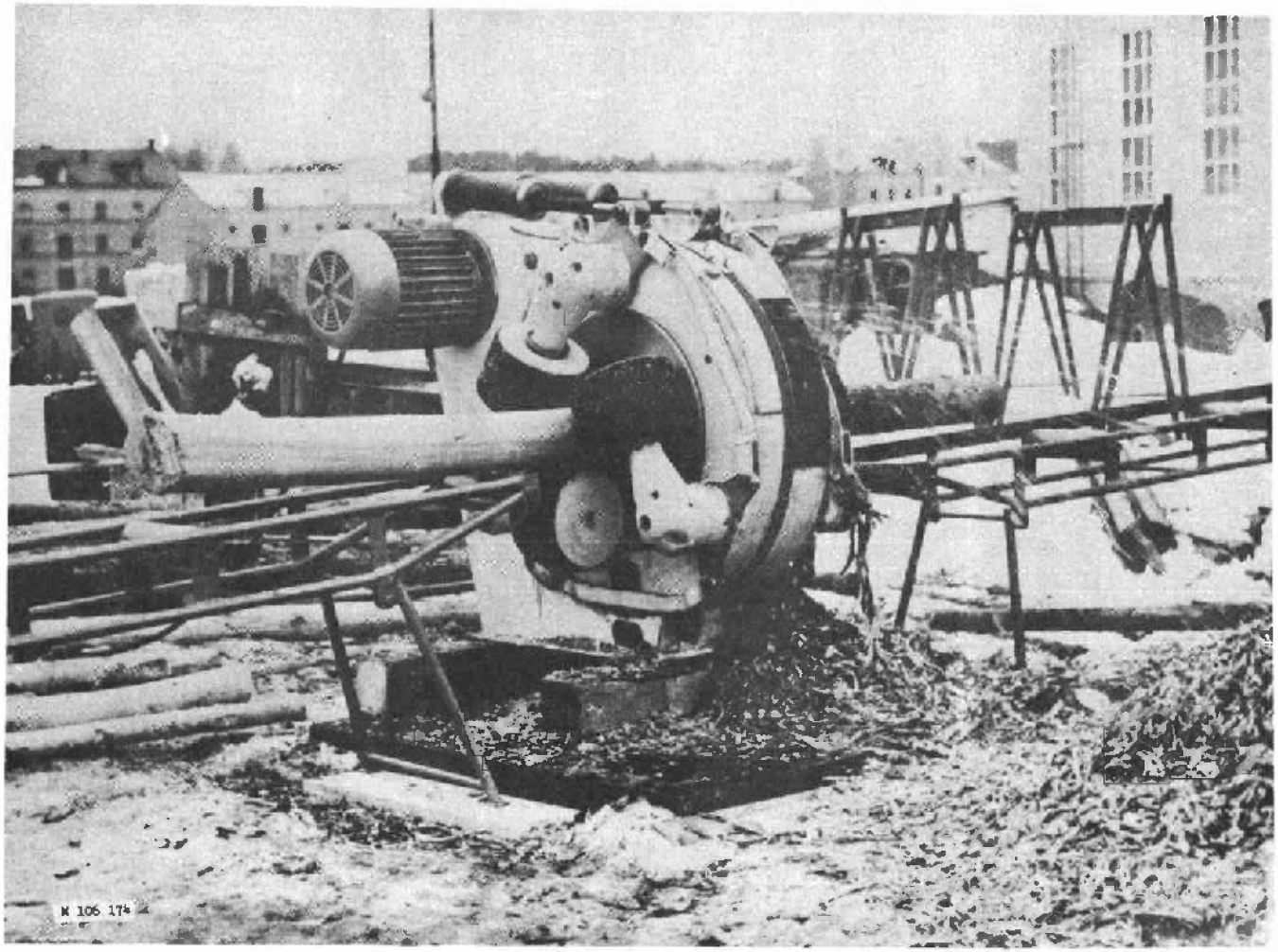

Figure 8. --Cambio pulpwood debarker.

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Burnt River Debarker

Made by the Sumner Iron Works, Everett, Wash.

The Burnt River debarker has four floating cutterheads and two floating revolving flat brushes. The bolts are fed through the barker with a helical fluted roller and revolved by a longitudinal fluted roller. The cutterheads and brushes are mounted on pivoted arms so that they can follow the surface of the bolts. They are pressed down pneumatically on the bolts. The cutterheads have helical cutters with blunted edges so that they scrub off the bark and do not cut into the wood. The brushes are used to remove the remaining bark. On both the infeed and outfeed ends, the bolts are held down with top wheels that are pneumatically pressed against the bolts. The operator can control the pressure on the cutterheads, brushes, rate of feed, and the revolutions of the bolts.

General information on the smaller Burnt River debarker

Log diameters	4 to 18 inches
Log lengths	8 feet
Feed rate	25 to 50 f. p. m.
Power required	Three 20 h. p. and one 10 h. p. motor
Approximate cost	$48,000

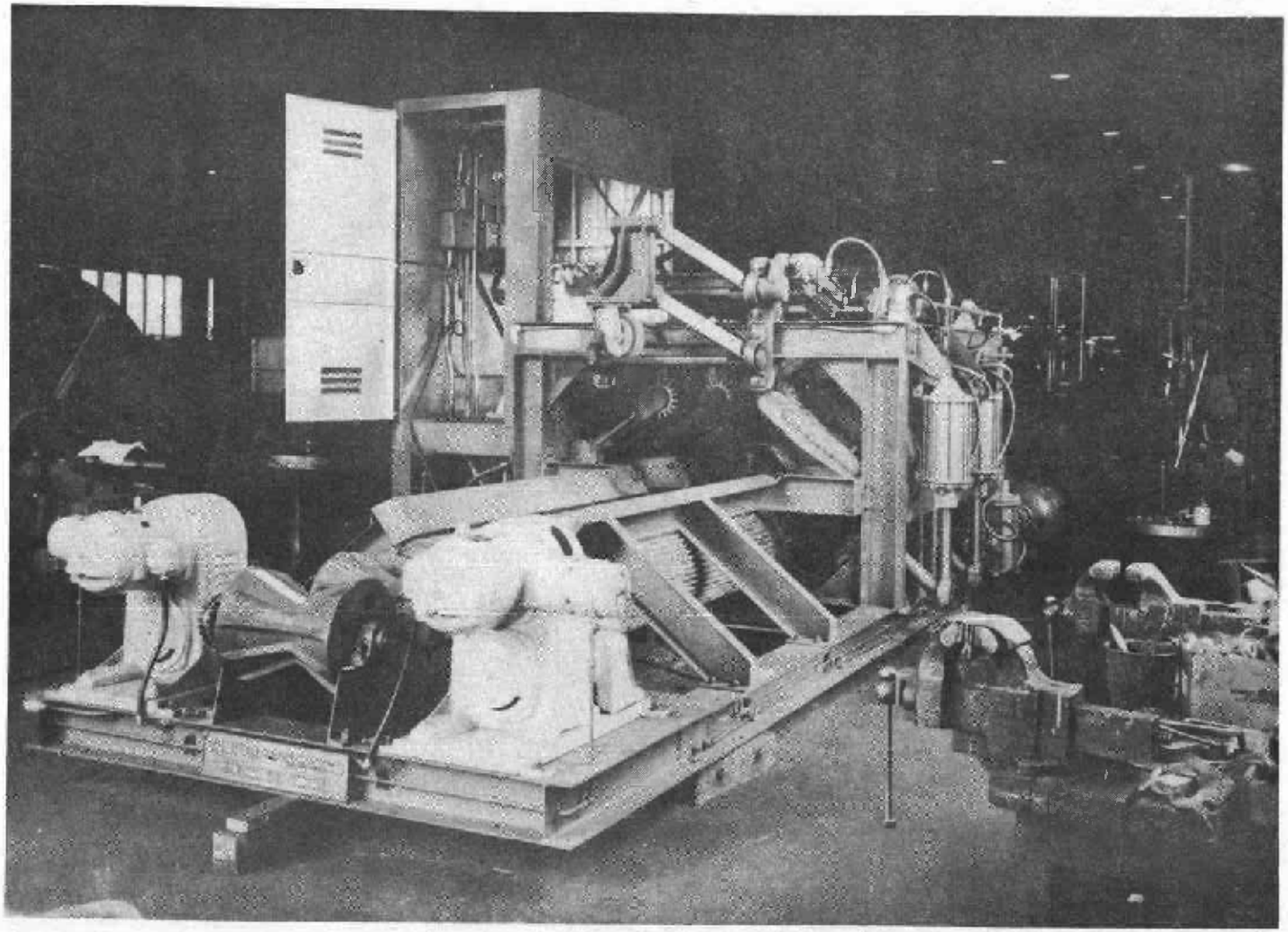

Figure 9.--Burnt River pulpwood debarker.

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Carpenter Debarker

Made by Soderhamn Machine Manufacturing Co., Talladega, Ala.

The Carpenter pulpwood debarker is a portable unit of the impact or hammer type with flailing chains that beat off the bark. Four rows of short chains with one end fastened to the chain head are driven by V-belts from a counter shaft and a 25 horsepower gasoline engine. The head is raised or lowered for different diameter bolts. The bolts are cradled, rotated, and fed through the machine by fluted rollers. By changing the angle of the axis of these rollers, the rate of feed can be changed to meet different barking conditions. About twenty of these machines are being used by small operators in the South.

General information on the Carpenter debarker

Bolt diameters	2-1/2 to 20 inches
Bolt lengths	4 to 9 feet with extension
Feed rate	Maximum 40 f. p. m.
Power requirements	25 horsepower
Approximate cost	$2, 800 f. o. b. factory

Crouse Debarker

Made by Crouse Manufacturing Co., Crouseville, Maine.

Hurricane Debarker

Sold by the Wood Treating Chemical Co., 5137 Southwest Ave., St. Louis 10, Mo.

Augustin Debarker

1810 West Platte Ave., Colorado Springs, Col.

All three of these companies manufacture the floating cutterhead type of pulpwood peelers. Peelers of this type are used more for peeling posts and poles than for peeling pulpwood. Pulpwood operators object to the loss of wood in peeling with this type of machine. On straight, smooth bolts the wood loss is rather low, but on rough, crooked bolts the wood loss is rather high. One advantage of the floating cutterhead peeler is that the bolts can be peeled at about the same rate at all seasons of the year, since milling off the bark is not affected by different degrees of adhesion of the bark. Knife barkers also smooth the bolts, cutting off bumps and limb stubs and making the loads more compact.

The bolts are cradled, rotated, and fed through the debarker by bull wheels. By changing the angle of the axis of these wheels, the rate of feed can be altered. The cutterhead is mounted on pivoted arms so that the head can be raised or lowered for different diameter bolts. The depth of cut is adjusted by raising or lowering the shoes on each end of the head. These shoes ride on the surface of the bolt, making the cutterhead follow the contour of the bolt.

General information on the floating cutterhead pulpwood peelers

Bolt diameters	2-1/2 to 10 inches
Bolt lengths	4 to 18 feet
Capacity	2-1/2 cords per hour
Power required	15 horsepower
Approximate cost	$3,000 to $4,000

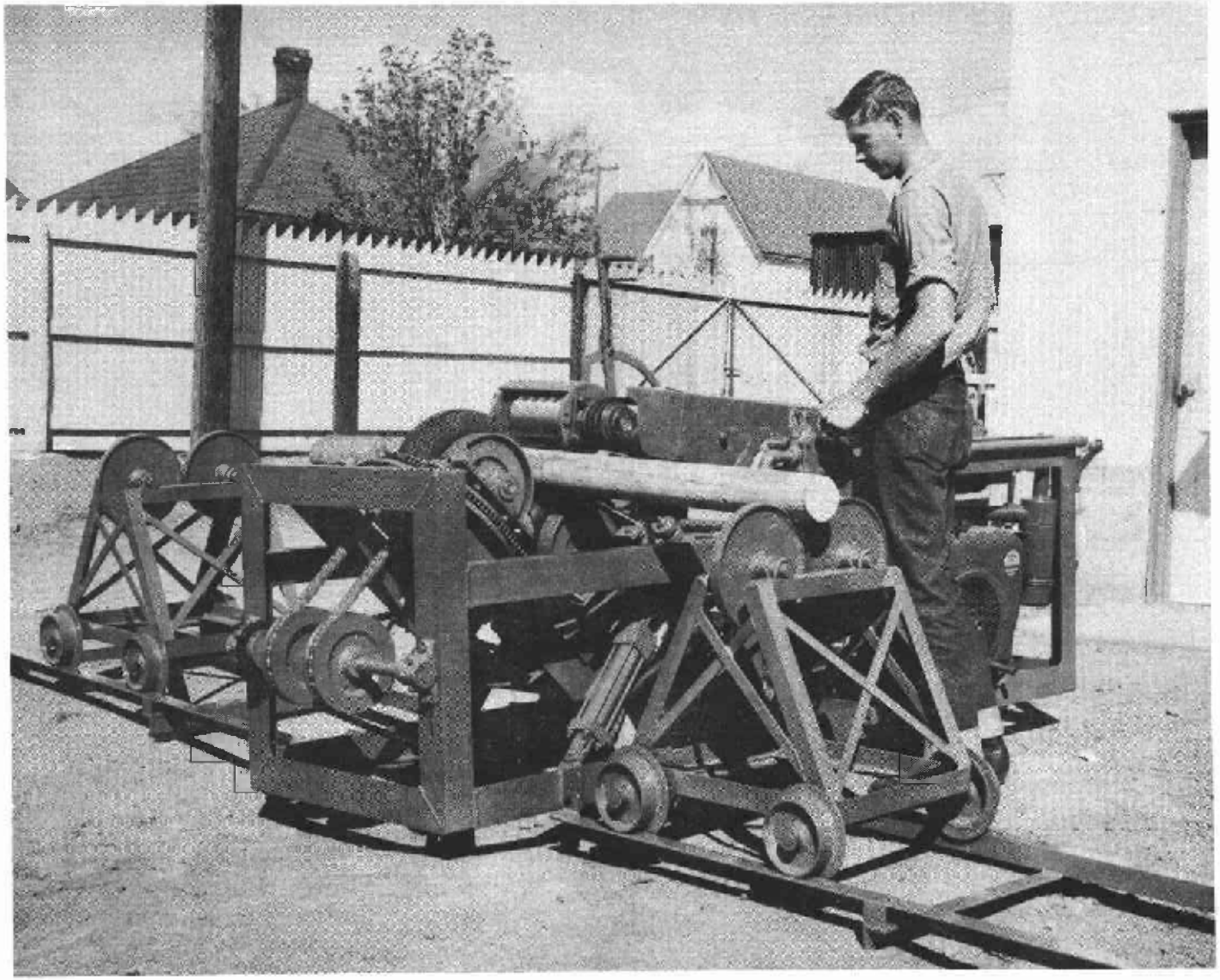

Figure 10. --Floating cutterhead debarker.

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Peppy peeler

Made by Sandy Hill Iron & Brass Works, Hudson Falls, N. Y.

This portable debarker is of the fixed cutterhead type. The unit has two sets of knives on the cutterhead. The first set cuts off knots, limb stubs, etc., while the second set, which is set between two rings on the head, mills off the bark. The second set of knives can be set at different distances beyond the circumference of the rings varying the depth of cut.

The bolts are cradled between the cutterhead, front roller, and the top toothed wheel. The cutterhead revolves in fixed bearings, while the front roller moves toward and away from the cutterhead as the top wheel is lowered or raised. The top toothed wheel revolves and feeds the bolt through the machine. The rate of feed can be varied by changing the angle of the axis of this wheel. The unit also has side and end supports. The end supports are spaced so that only one end of the bolt is supported at a time.

The Peppy peeler should do a good job of removing the bark, but the wood loss is usually objectionable.

General information on the Peppy peeler

Bolt diameters	3 to 20 inches
Bolt length	4-foot standard, with separate supports
Capacity	2 cords per hour
Power requirements	24 horsepower
Approximate cost	$4,000 f. o. b. factory

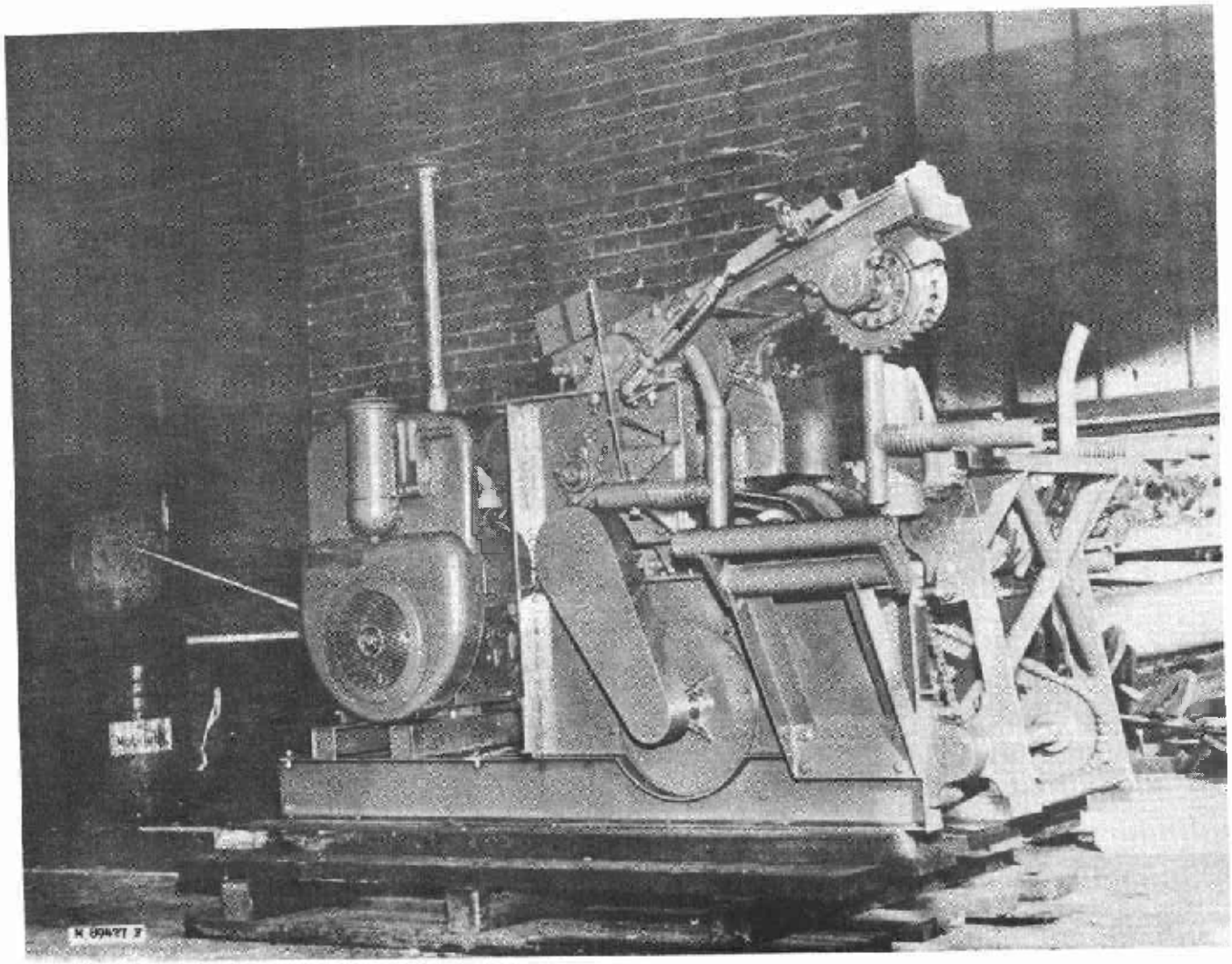

Figure 11. --Peppy peeler.

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SLAB DEBARKERS

A high percentage of lumber, especially in the South, is produced by small mills whose production is too small to operate any of the present day debarkers economically. One solution would be to haul the slabs and edgings to a concentration point where this material from several small mills would be debarked and chipped. As yet, only a small amount of bark-free chips is being recovered from small mills. The progress made in the developing of mechanical slab debarkers has been slower than in the developing of sawlog debarkers. Several companies, however, are working on mechanical slab debarkers. To date perhaps the most successful slab barking operation that we know of in the South is at the Clancy Lumber Company at Decatur, Ala.

Hydraulic Slab Debarker

Made by Jackson Industries, Birmingham, Ala.

This slab debarker is installed at the Clancy Lumber Company, Decatur, Ala. The barker consists of a pronged conveyor chain that carries the slabs face down under two stationary nozzles. These nozzles are set 30 degrees from the vertical pointing toward the infeed end. The hold-down chains on both the infeed and the outfeed ends are pivoted on the sprocket shaft, and are built up of four chains that are individually forced against the slabs with springs. These chains firmly hold the slabs against the conveyor chain and also aid in feeding the slabs or edgings through the debarker. The pump supplying the water to the nozzles delivers about 600 gallons per minute at about 800 pounds of pressure, and requires about 260 horsepower.

General information on the Jackson slab debarker

Maximum cross section of slab	16 inches wide, 8 inches thick
Feed rate	About 140 f. p. m.
Capacity	About 5 cords per hour
Power required	260 horsepower
Approximate cost	$23,000 f. o. b. manufacturing plant