

The American Society of Mechanical Engineers
29 W. 39TH ST., NEW YORK, 18, N.Y.

Paper No.

52-S-14

SOME TECHNICAL ASPECTS OF TRIMMING LUMBER
IN THE PLANING MILL

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Advance Copy
Released for publication upon presentation

Contributed by the Wood Industries Division for presentation at the Spring Meeting, Seattle, Washington - March 24-26, 1952 of The American Society of Mechanical Engineers. (Manuscript received at ASME Headquarters February 11, 1952.)

DISCUSSION OF THIS PAPER WILL BE ACCEPTED AT ASME HEADQUARTERS
UNTIL MAY 1, 1952.

(Printed in U.S.A.)



SOME TECHNICAL ASPECTS OF TRIMMING LUMBERIN THE PLANING MILLABSTRACT

This paper discusses four classes of lumber trimming machines applicable to the planing mill. The classification is made according to function as follows:

Irregularity or defect removal to increase the value of the residual portion.
 Double end trimming to a length standard acceptable by the trade,
 Trimming to specified lengths of the higher grades of stock after it has been tied into bundles, and
 End matching to random length stock to permit fuller utilization of the shorter lengths.

The argument is offered that a finished piece of lumber is not completely ready for the market until the two ends as well as the four sides have been machined.

* * * *

The objective of this paper is to discuss the purpose and nature of machines designed to trim lumber in a planing mill. By way of introduction one might set down Webster's definition of trim: "To make . . . neat, or right by cutting . . .; to dress; to make smooth . . ."

For the purpose of this discussion the foregoing definition is incomplete, for in addition to making lumber "neat, right, or smooth," the planing mill trim saw must also cut the board at a true right angle in relation to both longitudinal and transverse axes, and in addition, with the exception of end matching, yield a board accurate in over-all length dimension.

Generally speaking, lumber is trimmed for one or more of several reasons, i.e., to better the grade, to decrease shipping charges through a saving in weight and space, to prepare the stock for subsequent treating or distinctive end marking, to increase usability and hence salability because of accuracy of length trim, to increase utilization through end matching, and finally, to establish a uniform practice for pricing and selling purposes.

The function of the various lumber trimming machines may be divided into four classifications as follows:

Irregularity or defect removal to increase the value of the residual portion,

(b) Double end trimming to a length standard accepted by the trade.

- (c) Trimming to specified lengths of the higher grades of stock after it has been tied into bundles, and finally
- (d) End matching of random length stock to permit fuller utilization of the shorter lengths.

SAWS FOR REMOVAL OF IRREGULARITIES

Illustrative of a machine to perform the first of these functions i.e., irregularity or defect removal to increase the value of the residual portion, is the overcutting saw illustrated in Figure 1.

The requirements of such a tool call for extremely rapid selectively automatic stroking with no sacrifice of precision due to rapidity of action. The travel of the saw blade must be such that the board is cut perfectly square and without tearing on face or edge. Response to operator actuation must be instantaneous and positive in order to combine speed with accuracy of stock handling. The actuating mechanism must be so arranged that operator safety is maximized.

Figure 2 shows the manner in which the overcutting saw is used singly. A more popular and more efficient system of installation is shown in Figure 3. Figure 4 shows a more detailed view of the twin setup. By means of such an installation one man can boost his production at least 50% over that possible with a single saw. It will be noted that swinging stops in the guide permit cutting to specified length as well as accomplishing the primary function of irregularity removal.

For a "merry-go-round" trim operation, right and left hand saw units are controlled by extended foot pedals so that either saw may be actuated by a single operator standing between the two saws. Closely inspected defect trimming can be done rapidly and with a minimum of handling because the operator works with both hands positioning the stock so that it is trimmed by the saw nearest to the defect.

Significant mechanical details of this over cutting saw are shown in Figure 5, 6, 7, 8 and 9. To further visualize the function of the saws in a production line, refer to Figure 10. The saw described is capable of stroking up to 60 times a minute, both rate of stroking and length of stroke being adjustable.

Indicative of the capacity of these machines is the fact that a pair of them mounted in twin fashion and manned by a single operator can handle the irregularity trimming behind a "green dimension" planer and matcher feeding at 1,000 lineal feet per minute.

DOUBLE END TRIMMERS

In discussing the design of a machine to have the primary function of equalizing or double end trimming random length lumber, two possibilities present themselves.

In order to accommodate the varying lengths of lumber it is possible to mount one fixed saw and adjust a second saw to each board length; or, as an alternate, saws may be placed at each standard length position and simply manipulated to let only the desired two saws function on any one board.

An example of the type first named is shown in Figure 11. In this figure it will be noted that the right hand saw is stationary, and the two left hand saws move to adjust to the length of the lumber involved. Two movable saws are used in order to accommodate lumber of two lengths without a change in setup. The lift wheel mounted between the left hand saws automatically lifts the median saw out of the way if the board is long enough to reach the wheel. The saws are adjusted for lumber length by means of the push button controlled traversing motor illustrated in Figure 12. The lever for lifting the movable saws preparatory to moving them and for subsequent locking in position is shown on the extreme left of this figure. Further detail of the positioning device is shown in Figure 13.

Relationship of the two movable saws is shown in Figure 14. Note that the two saws are set at a fixed interval, the one positioning device serving both saws. The lift wheel for the median saw can be adjusted for saw diameter to compensate for wear. Bumpers absorb the shock as saws are dropped into cutting attitude following each change of position.

Figure 15 shows a three-saw equalizer in action. Generally speaking, such a machine is installed between a tilting unloader and a matcher, and should not be expected to handle lumber for planers that operate at lineal feed rates in excess of 600 feet per minute. It is apparent that such a machine will function efficiently only in those plants where lumber is sorted into one or two lengths before it is presented to the trimmer.

An example of the multiple saw type of double end trimmer is shown in Figure 16. Its position in the production line may be further visualized by reference to Figure 10. As can be observed, a cut-off unit is located at every standard length, with the mechanism being so arranged that only two saws are in the cut at any one time. This feature, which is entirely automatic is accomplished through the use of lift wheels attached to each saw ladder. In other words, the trimmer automatically double end trims the board to the longest possible standard length.

Significant details of the machine are shown in Figures 17 and 18. This mechanism has the obvious advantage of being able to handle random length lumber without the necessity of machine adjustment for lumber length. In common with the two or three-saw equalizer, the random length trimmer is best applied in conjunction with planers that have feed speeds below 600 lineal feet per minute.

Depicting blowpiping and waste disposal for such an installation is the arrangement shown in Figure 19. Illustrative of one of several mechanisms that have been designed to assist the feeder in presenting boards to the machine is the cam loading device shown in Figure 20.

An important variation of the multi-saw plain automatic random length trimmer is the selectively automatic machine. By providing each lift wheel with a remotely controlled latch connecting to its saw ladder, Figure 21 and 22, intermediate saws may be left in the cutting position, thereby making possible the simultaneous action of double end trimming and trimming out of irregularities, or the separating of the high grade end of the board from the low grade end. Figure 23 shows such an installation. The position of this machine in the production line is apparent in Figure 24.

A problem related to double end trimming is that of single or double end printing. If the end printing is accomplished on the trimming machine it is not feasible to work with a selectively automatic random length trimmer because of the mechanical difficulty involved when intermediate cuts are made. Similarly, it is apparent that the problem of double end printing becomes more complex if a plain multi-saw trimmer is used to double end trim, although single end printing does not present a particularly difficult problem on such a saw.

It can be appreciated from looking at Figure 25 that the double end printer is most easily applied to a two-saw equalizer where one printer remains stationary at the zero saw and the other traverses in harmony with the movable outboard saw.

BUNDLE TRIMMERS

The complexity of machines designed to double end trim lumber after it has been graded, length sorted, and tied in bundles, depends in a large part on the degree to which the mechanism must be fully automatic. As is the case with most design problems, there are a number of possible solutions. The most frequently used methods involve:

Moving the bundled stock past a single cut-off saw and trimming the ends in two separate operations

Mounting multiple saws at fixed intervals and actuating only the two saws necessary for the proper trimming of each bundle length

- (c) Mounting a fixed zero saw in conjunction with a movable outboard saw which can be positioned according to bundle length.

An over-all view of the simplest type of bundle trimmer as outlined in (a) of the preceding paragraph is illustrated in Figure 26. Note the side clamp in operation at the cut-off point and the solenoid controlled air actuated stops which regulate the bundle length. The step by step procedure for length trimming bundles is as follows:

The accumulated bundles come on chains to the tiers, who butt each bundle against an air positioned stop

The bundle is tied and one end is trimmed

- (c) The operator pushes a button corresponding to the length of the bundle being rimmed, which actuates a solenoid air controlled stop

The powered rollers butt the bundle against this stop

The bundle is held with an air operated clamp while the irregular ends of the bundle are trimmed off by the cut-off saw.

Figure 27 shows a close-up of this bundle trimming operation.

Generally speaking the capacity of this machine is suitable to handle the output of a moulder or matcher operating at feed speeds up to 300 lineal feet per minute. As a bundle trimmer for flat stock it should perhaps be equipped with a top pressure device in order to insure a tight bundle.

The multiple saw type bundle trimmer is illustrated in operation in Figure 28. Figure 29 illustrates more clearly the multiple mounting of the undercutting saws. The rotative sequential positioning, end butting, top clamping, trimming, and discharge actions of this machine are illustrated in Figure 30.

The most thoroughly proven production bundle trimmer is of the equalizer type, that is, having one fixed saw and a second movable saw to accommodate varying bundle lengths. Figure 31 shows the infeed side of such a machine. The movable saw unit is shown traversed to an intermediate bundle length. The traverse motor on the right end of the track is controlled by switches located at each of the desired bundle lengths.

The sequence of operation for this almost completely automatic machine is as follows:

- (1) Control is set for length
- (2) The bundle which has just been trimmed strikes a switch as it falls to the takeaway conveyor belt and starts the carriage to its new setup

Locating lugs, limit switch controlled, drop into slots

The traversing motor stops

The incoming bundle is pulled on to the supports by hand

The air operated end pusher fingers, as illustrated in Figure 32, which are mounted on the fixed saw end, ram up the individual boards against a flat bumper plate located on the movable saw end,

The side clamps come up, actuated by a limit switch on the ram up piston rod

Top clamps, actuated by a limit switch on the end of the piston rod of the ram up fingers, come down

The end plates withdraw

Both saws come down simultaenously following actuation by the limit switches tripped when the side plates come up

The saws return to neutral actuated by a limit switch at the end of their travel

Ram up plates and top clamp release actuated by a limit switch as the saws returned to neutral

The operator trips a knee switch, and the tied bundle drops to the conveyor belt, starting the cycle all over again.

The location of this machine in the lumber production line is shown in Figure 33. It has sufficient capacity to handle stock coming from a flooring matcher at lineal feed rates up to 600 feet per minute.

END MATCHERS

No discussion of trimming in the planing mill is complete without touching on the function of end matchers. The function of the end matcher is to machine mating tongues and grooves on the ends of short random length boards in order to conserve material, and also in order to enable the carpenter to obtain a smoother finished surface, whether it be siding or flooring. One of the advantages of end matched lumber lies in the fact that the end joint need not lie on a stud, that is to say, the joint is self locking. Lumber patterns, in addition to flooring, that are frequently end matched are illustrated in Figure 34.

The location of end matchers in the planing mill production line is shown in Figure 33. These machines operate as a pair, one left hand groove machine and one right hand tongue machine being the usual standard. Figure 35 shows a right hand tongue unit. Figure 36 illustrates a left hand groove unit.

The principal requirement of an end matcher is a true running feed bed, because the precision of the right angle cross cut achievable depends entirely on the squareness of the lugs as they travel past the cut-off and machining heads. As can be seen from Figures 35 and 36, two tensioned spring steel ribbons hold the face of the stock against the solid top plate. The tension of the ribbon is infinitely variable by means of the spring adjusters so that the desired yielding pressure can be exerted on the stock to line it up squarely against the feed lugs and hold the face of the board firmly against the top solid pressure platen. Thus, the machining of the end tongues and grooves is gauged from the face of the stock, thereby assuring perfect face match.

Significant mechanical details of the machine are shown in Figures 37, 38, and 39.

In conclusion, these four saw types, i.e., machines to trim out irregularities, double end trimmers, bundle trimmers, and end matchers, represent specialized tooling for the production machining of the ends of lumber.

It is unfortunate that so many mill operators believe their job is completed when they have machined only four sides of a board — for in reality there are six surfaces to be considered on any rectangular solid. The possibility of increased salability of the finished product and or reduction in unnecessary freight charges should make the installation of lumber trimming equipment economically attractive to all lumber manufacturers.

CAPTIONS

- FIGURE 1 Selectively automatic overcutting single Trim Saw
- FIGURE 2 - Two single overcutting Trim Saws mounted one behind the other, so arranged that each machine has its own operator.
- FIGURE 3 Modern moulding factory tooled for high speed production of stock mouldings. Stock coming from the moulder which needs to be trimmed is pulled off on to the chains and then proceeds to the Cut-Off Saws in twin arrangement. Trimmed mouldings then return to the grading chain by means of belt in front of the operator.
- FIGURE 4 Twin overcutting Cut-Off Saws
- FIGURE 5 Strong, lightweight aluminum saw arm for overcutting Cut-Off Saw. Arm is securely trunnioned to a heavy cast iron base and operates on tapered roller bearings. Note eccentric trunnion adjustment for positioning cutting edge of saw relative to saw bench.
- FIGURE 6 - Saw arbor, collars, and rotor for Over-Cutting Saw. The arbor is tapered to perfectly fit the bore of the saw motor rotor and the rotor and arbor are keyseated and carefully balanced separately and together — statically and dynamically.
- FIGURE 7 Saw in rest position. The driving friction "A" is disengaged from both stroking drum "B" and reversing segment "C". Brake shoe "D" has engaged the raised braking surface "E" which is an integral part of the outer surface of the stroking drum. Crank arm "F" is therefore motionless and the saw is at rest in the retracted position.

FIGURE 7 - Cont.

To start the stroking cycle, foot pedal "G" is depressed which simultaneously releases brake "D" and engages driving friction "A" with stroking drum "B" causing it to be driven in the direction indicated and which in turn actuates crank arm "F" to thrust saw arm "H" forward into the cut.

FIGURE 8 - This illustrates saw in extreme forward position. Foot pedal "G" being still depressed, brake "D" is lifted and friction "A" is driving stroking drum "B" in the direction indicated. If foot pedal "G" is held down, stroking drum "B" will continue to rotate in the direction indicated and the saw will continue to stroke and return until the foot pedal is released. If at the instant illustrated foot pedal "G" is released, friction "A" will engage reversing segment "C" which will change the direction of the drum rotation and cause the crank arm "F" to reverse direction and return saw arm "H" under power to the rest position.

Note that hand crank "J" adjusts, in the directions indicated the position of pivot point "I" which in turn regulates the length of saw stroke available.

FIGURE 9 - This illustrates the saw being returned under power to the rest position. Foot pedal "G" has been released and driving friction "A" is engaged with reversing segment "C" driving it in the direction indicated. The saw arm will continue to be returned under power until friction "A" runs off of segment "C" at which time "D" will clamp on to raised surface "E" thereby bringing the saw to a controlled, bounceless stop in the rest position.

FIGURE 10 - Planing Mill Layout B. Equipment shown includes:

1. Tilting Unloader Hoist
2. Automatic Random Length Trimmer
3. Feed Table
4. Planer and Matcher
5. "Merry-go-round" for defect trimming with twin rapid Cut-off Saws
6. Tilting Reloader

FIGURE 11 - Three-saw Equalizer with fixed zero saw and two adjustable outboard saws, the movable saws being at a constant interval of 2 feet.

FIGURE 12 - Three-saw Equalizer showing clock face for push button length adjustment.

FIGURE 13 - Positioning device for movable saws on two or three-saw Equalizer.

FIGURE 14 - Two movable saws on three-saw Equalizer.

- FIGURE 15 - Three-saw Double End Trimmer with motorized traverse to set quickly the two right hand saws. The two adjustable saws are 2 feet apart and are traversed simultaneously, electrically, to any desired setting along the saw beam. The zero saw on the left remains stationary. Each saw has its own 5 HP (or 7 1/2 HP) 3600 RPM motor. A Tilting Unloader Hoist is used to break down lumber loads ahead of the saw. Trimmed lumber continues automatically on to the planer feed table and through a Planer and Matcher. In the foreground, note sticker removal belt following the Unloader Hoist.
- FIGURE 16 - Automatic Random Length Trimmer, outfeed side. The large holddown and lift wheels are a feature of this 30 HP to 50 HP machine. The wheels may be rubber covered when finished lumber is to be trimmed.
- FIGURE 17 - End section of Random Length Trimmer. Note heavy steel box girder backbone and the groove that is machined to match the tongue and groove mating surface of the saw units. This precision mounting is to insure permanent and accurate alignment. Saw ladders are mounted on anti-friction bearings, as are the saw arbors.
- FIGURE 18 - Random length trimmer saw arbor machined from a solid steel forging. The inside collar cannot slip and get out of alignment because it is part of the arbor.
- FIGURE 19 - View of blowpipe and waste disposal on a Random Length Trimmer.
- FIGURE 20 - Cam loading device designed to load each lug automatically on the feed chains of a random length trimmer. The cam followers, operating on the tail shaft of the feed chains, rise to hold back the flow of lumber to the chains and lower to permit the next board to fall on the trimmer feed chains. The roller wheel aids the movement of lumber to the feed chains.
- FIGURE 21 - Solenoid actuated latch, designed so that any or all of the selective saws remain in cutting position when their solenoid operated latches are energized, thus detaching the saw lift wheel and allowing it to pass over the board without raising the saw. This allows the saw to remain in cutting position. The lift wheel automatically relatches to its saw ladder after the defect trimmed board has passed.
- FIGURE 22 - Control station for electric selective random length trimming. The switches control the solenoid actuated latches connecting the lift wheels to their saw ladders.
- FIGURE 23 - Installation of selectively automatic Random Length Trimmer. Note selective control in foreground and automatic cam loaders preceding the trimmer feed chains.

FIGURE 24 - Planing Mill Layout A

1. Traveling Apron Deck Conveyor
2. Tilting Unloader Hoist
3. Sticker and Bunk Removal Conveyor
4. Feed Table
5. Planer and Matcher
6. Selectively Automatic Random Length Trimmer
7. Tilting Reloader

FIGURE 25 - Overhead type Double End Printer. View from infeed end showing board being printed.

FIGURE 26 - Single saw Bundle Trimmer with air operated stops and side clamp.

FIGURE 27 - Single saw Bundle Trimmer in Operation.

FIGURE 28 - Multiple saw Bundle Trimmer in operation.

FIGURE 29 - Saw locations on multiple saw Bundle Trimmer.

FIGURE 30 - End butting plate and clamping mechanism on multiple saw Bundle Trimmer. Note teeth of saw barely visible at bottom of picture. The trimmed bundle at left center is about to be released on to the takeaway belt at lower left.

FIGURE 31 - Two-saw smooth end Bundle Trimmer, infeed side.

FIGURE 32 - Fixed saw end of two-saw Bundle Trimmer illustrating ram up fingers and clamping devices.

FIGURE 33 - Planing Mill Layout C. Items of equipment shown in this arrangement include:

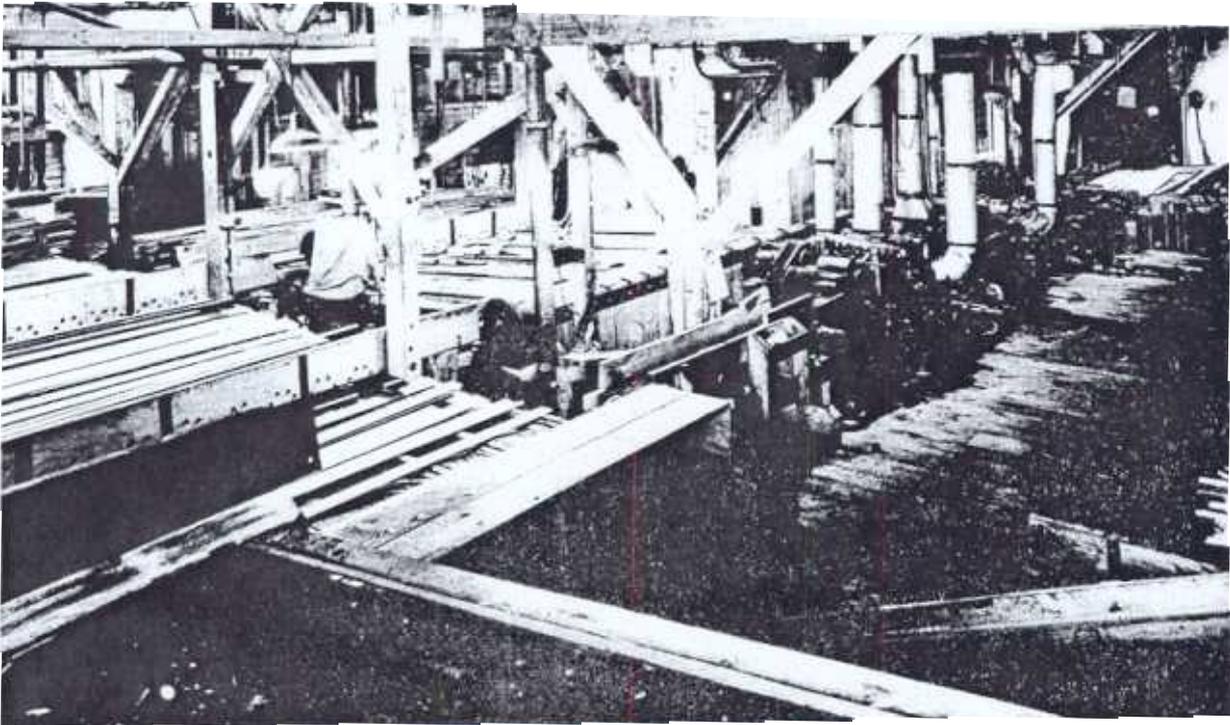
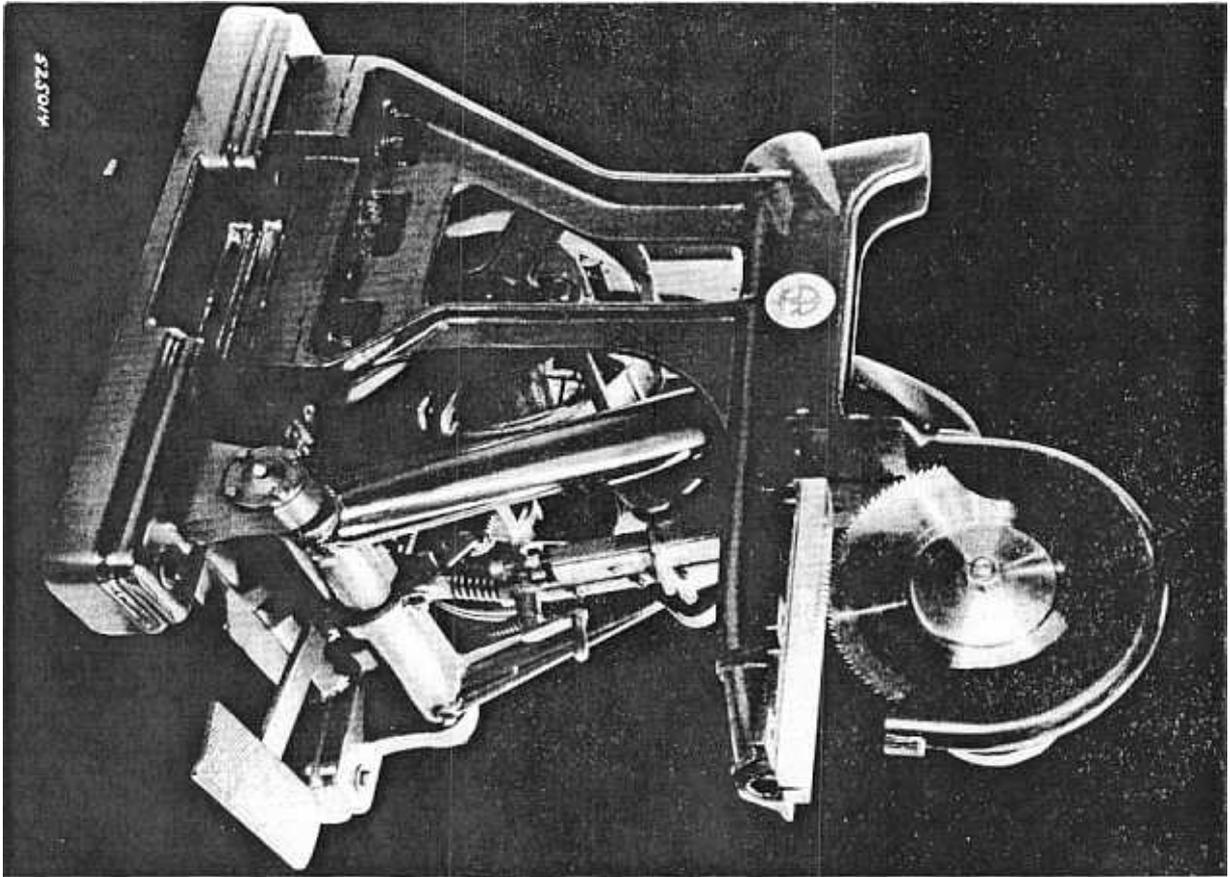
1. Tilting Unloader Hoist
2. Double Pineapple Feeding Table
3. Two-way thicknessing Planer and Matcher
4. Twin Trim Saws
5. Single Trim Saws
6. Automatic Bundle Trimmer
7. Saw Arbor Motor
8. End Matchers

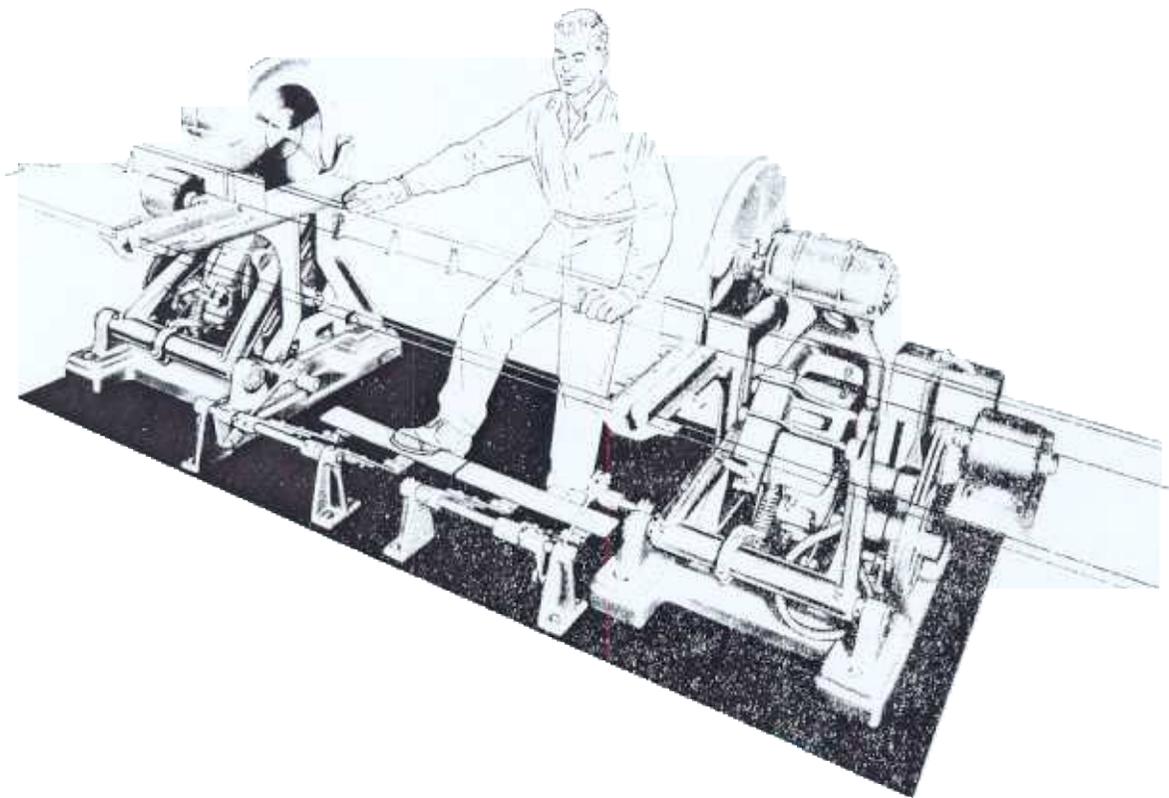
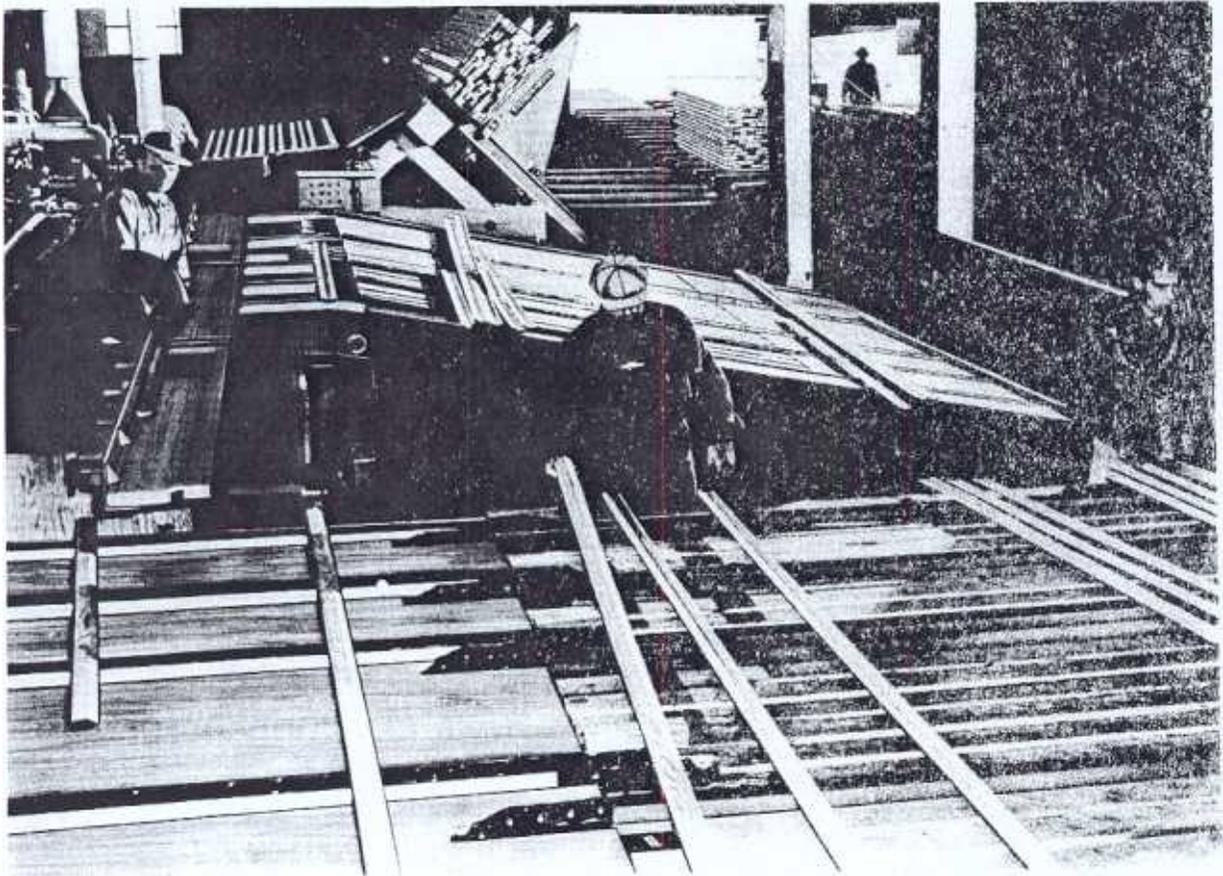
FIGURE 34 - Samples of end matched siding patterns

FIGURE 35 - Right hand tongue End Matcher, fully motorized, ball bearing, for normal or high frequency operation.

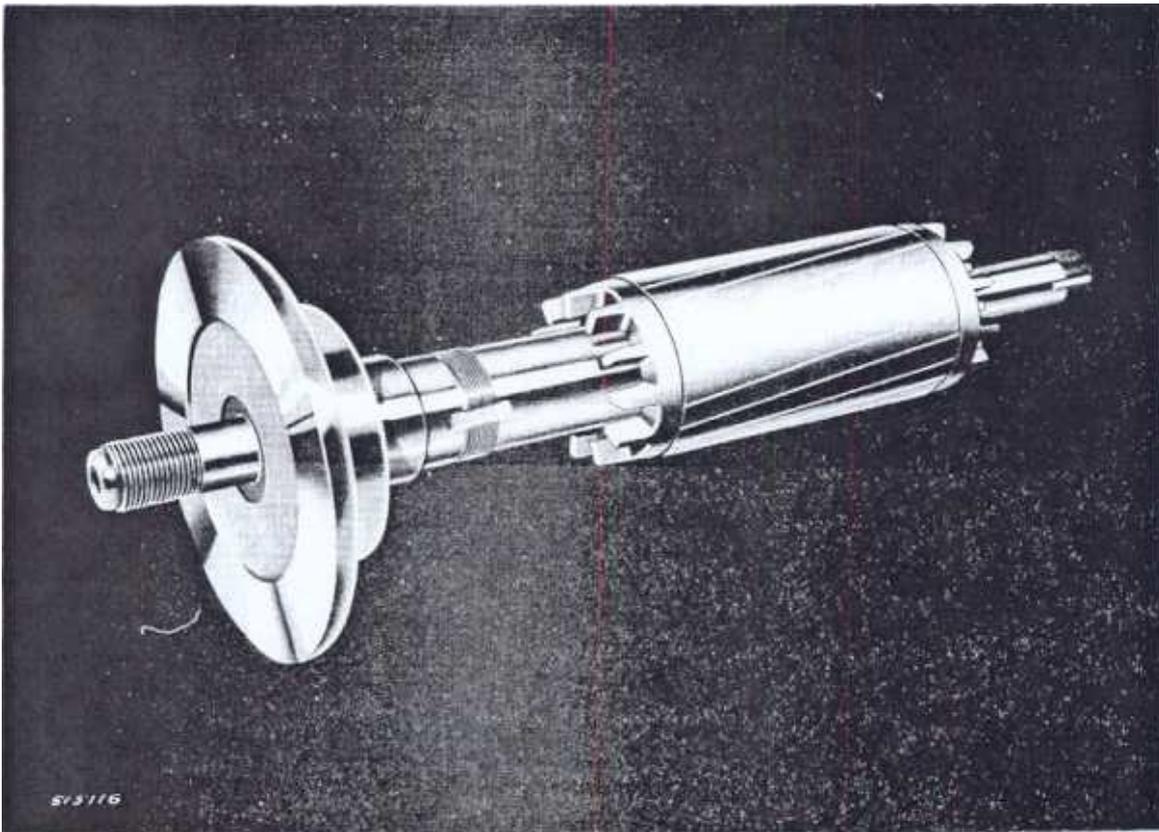
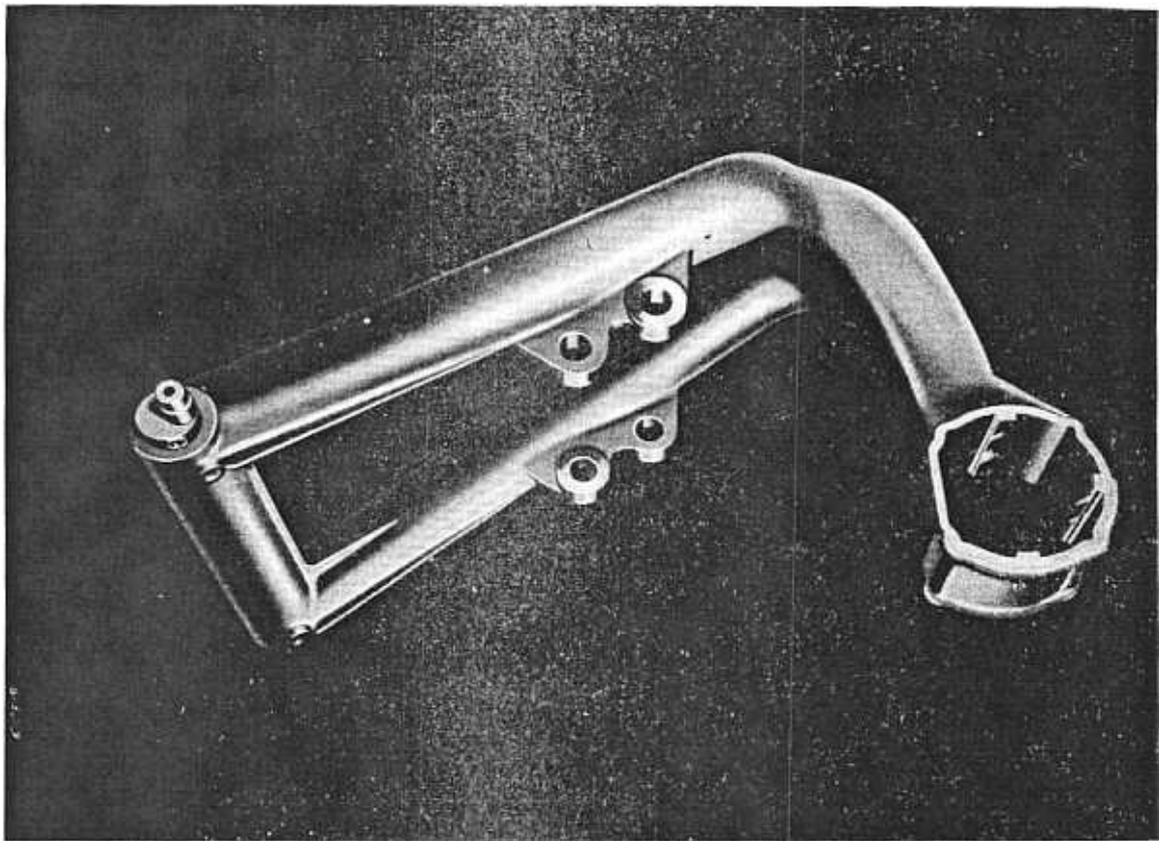
FIGURE 36 - Left hand groove End Matcher, fully motorized, ball bearing, for normal or high frequency operation.

- FIGURE 37 -** End Matcher safety switch mechanism. Note hinged arm which may be easily tripped by the operator to stop or reverse the machine in an emergency. If two or more boards on top of each other should start through the machine the feed motor will automatically stop and reverse until the safety switch is no longer actuated. A less severe over-thickness condition--but not enough to operate the hinged arm--will raise the yielding section of the top platen and also actuate the reversing switch.
- FIGURE 38 -** Solid End Matcher link articulated on needle bearings for absolute precision. Pusher lugs set in milled V groove to insure total accuracy of location.
- FIGURE 39 -** The gear motor driving mechanism is self-contained in the solid base of the machine, and is coupled to the driving gears and sprockets which operate in a continuous oil bath





FIGURE



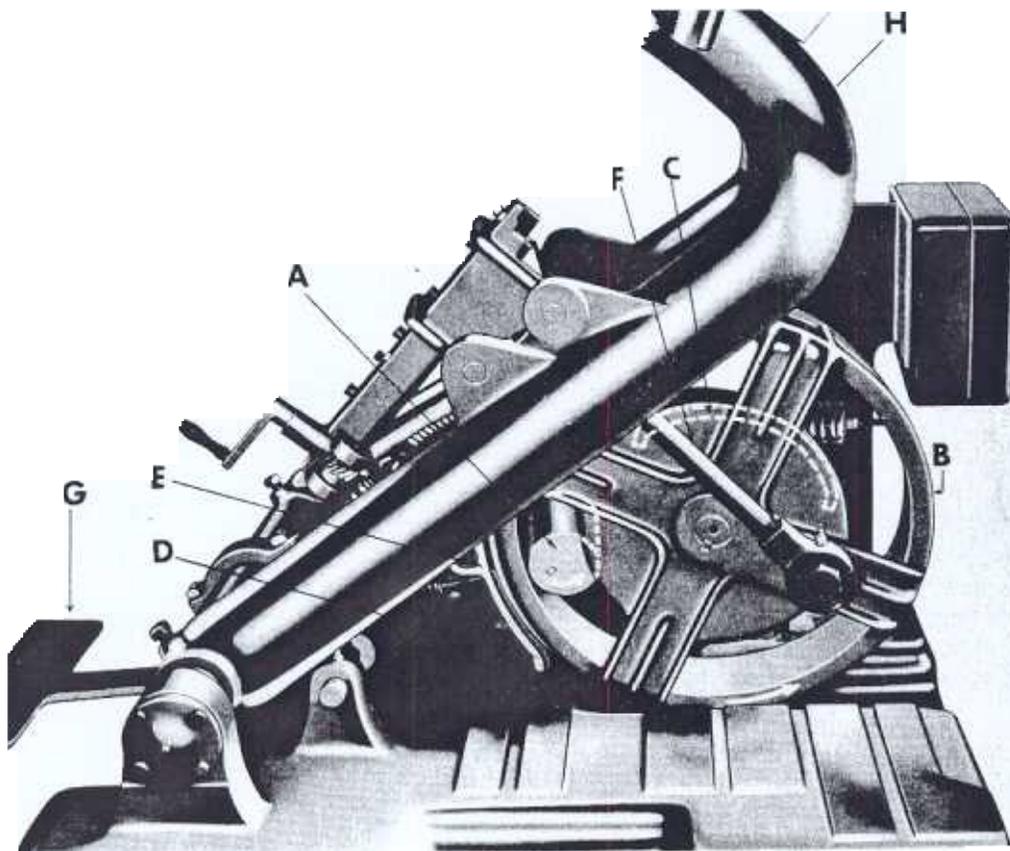


FIGURE 7

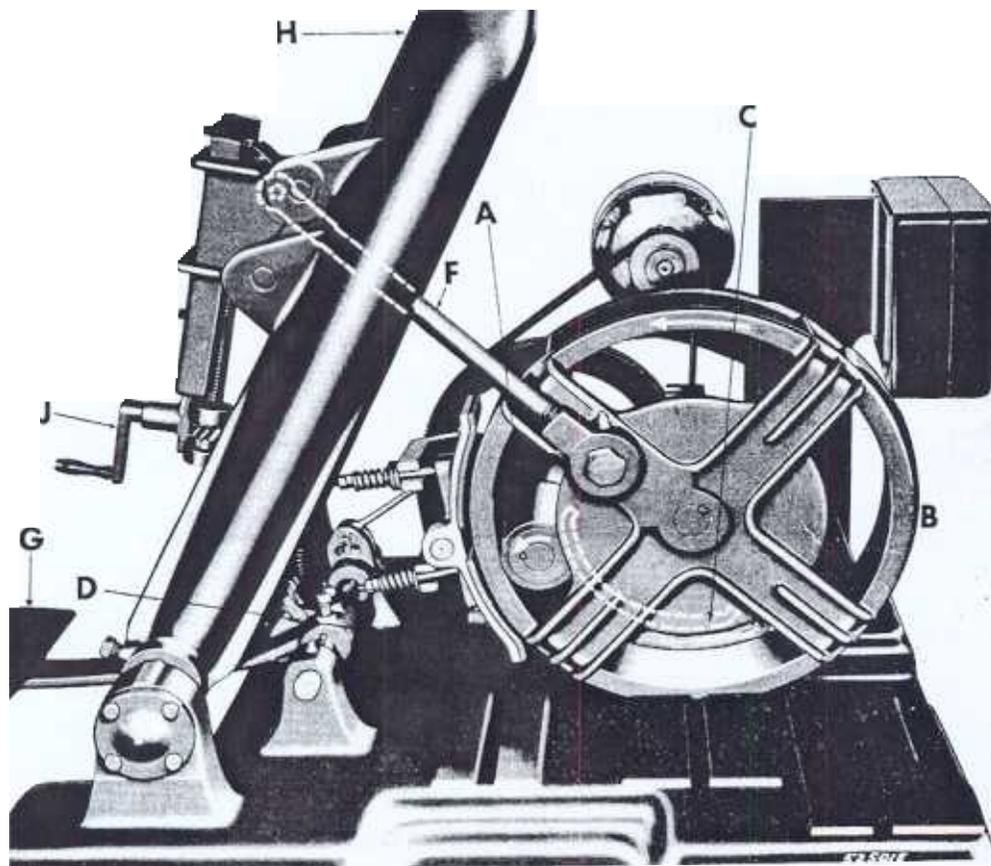


FIGURE 8

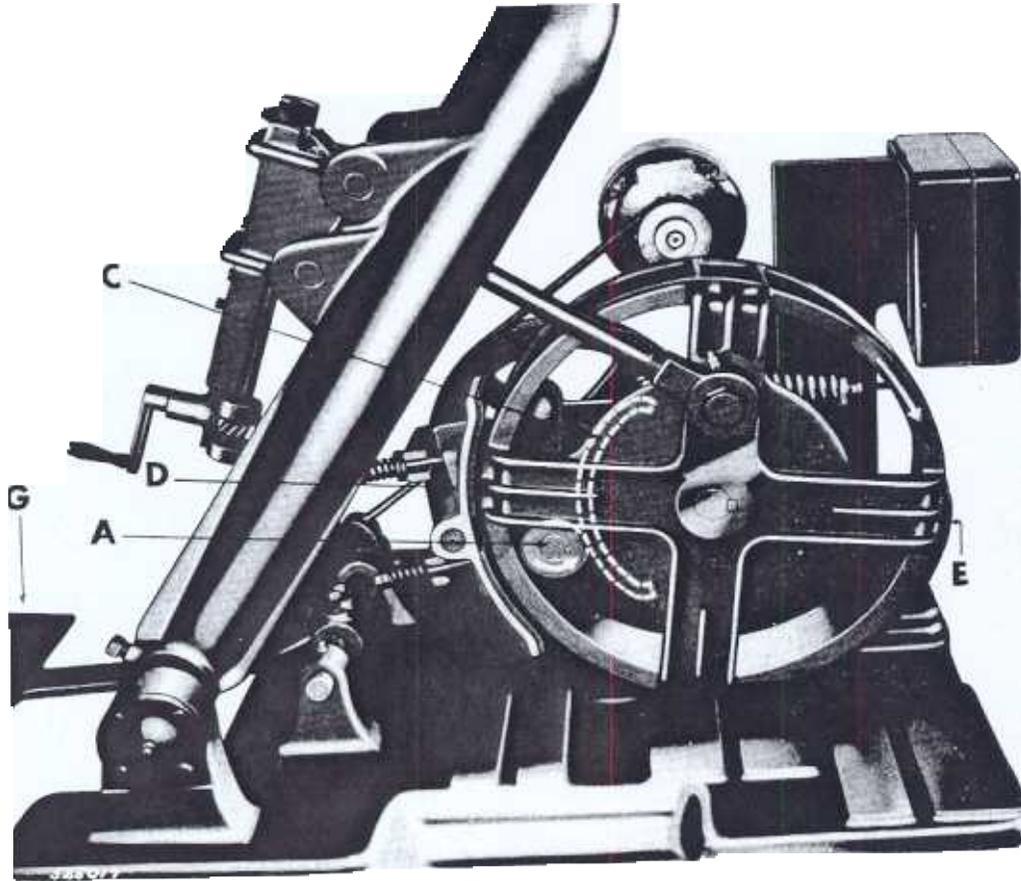
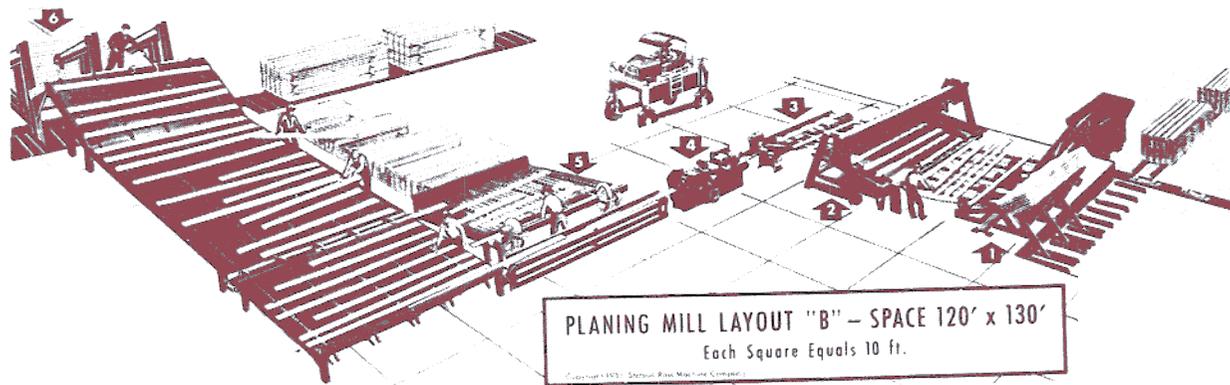
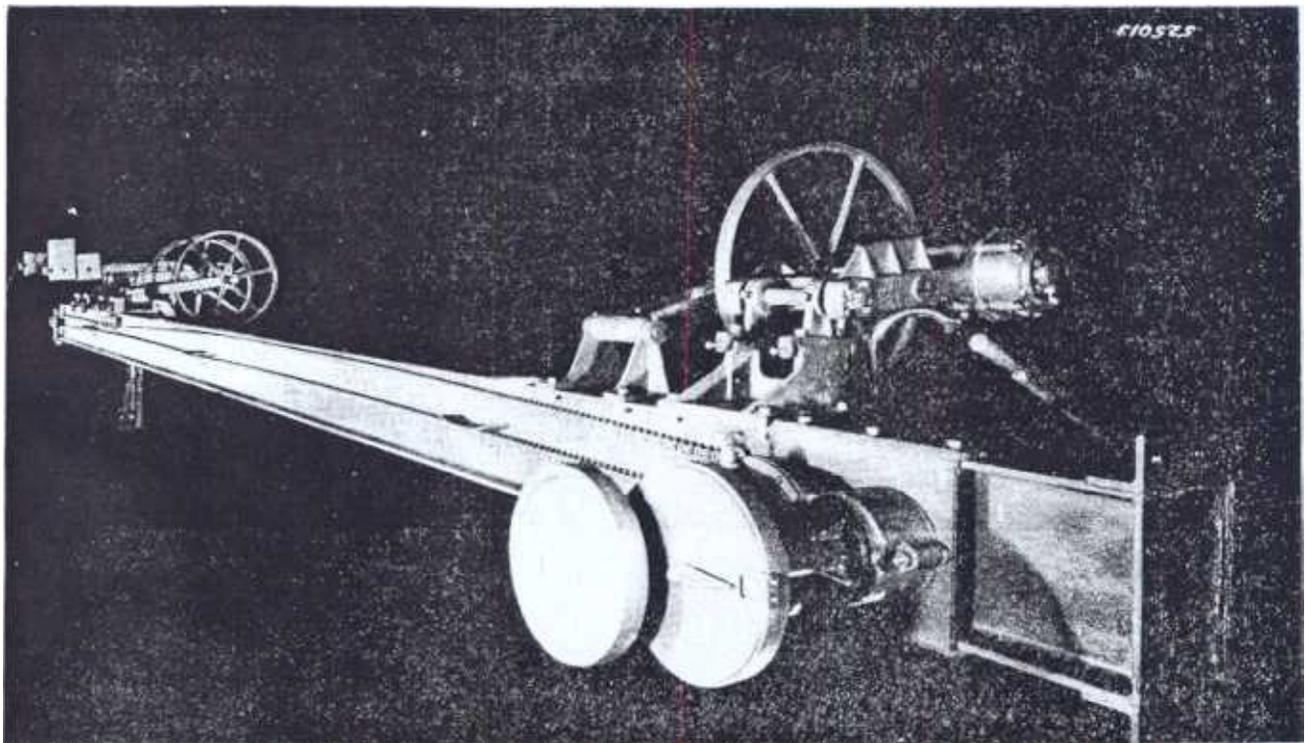
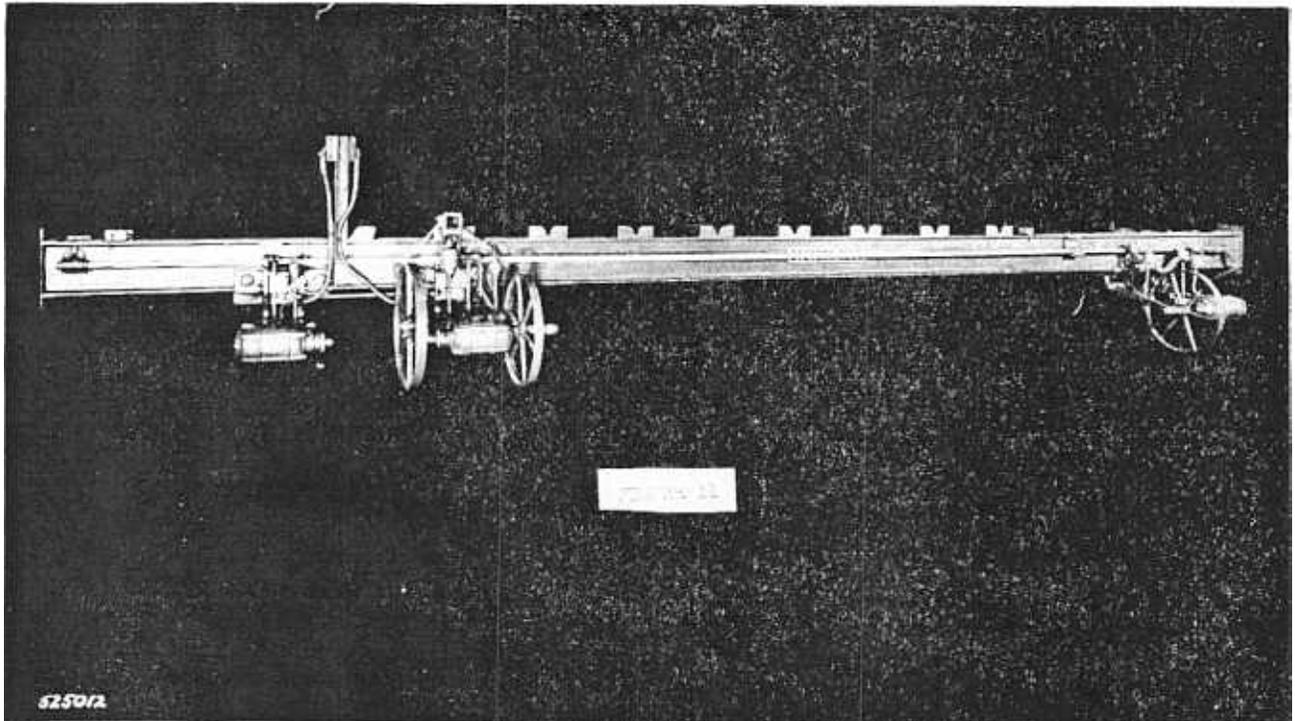


FIGURE 9



STETSON-ROSS PRODUCTION EQUIPMENT SHOWN: (1) 603E TILTING UNLOADER HOIST, (2) T-30 AUTOMATIC RANDOM LENGTH TRIMMER, (3) 511E FEED TABLE, (4) 6-10-A1 PLANER AND MATCHER, (5) "MERRY-GO-ROUND" FOR DEFECT TRIMMING WITH TWIN T-18 RAPID CUT-OFF SAWS, (6) 603RE TILTING RELOADER. 515094

FIGURE 10



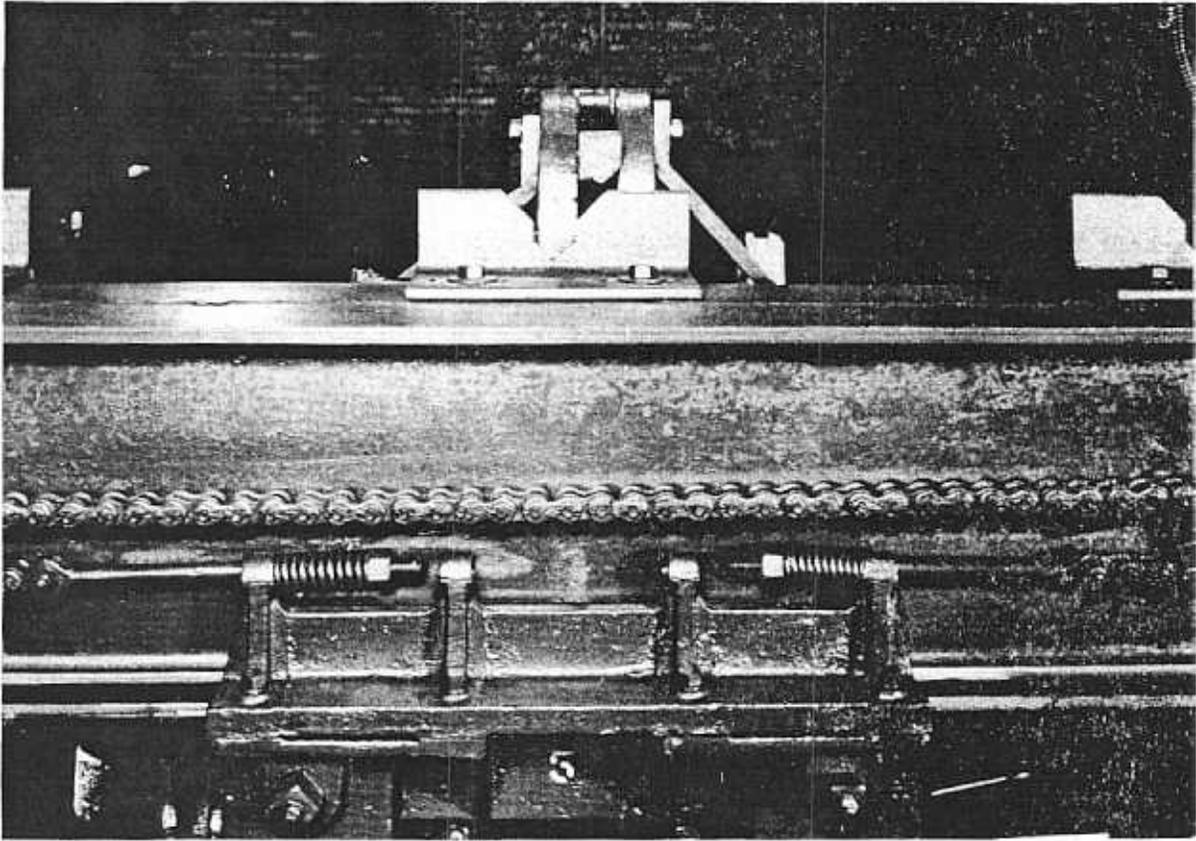


FIGURE 13

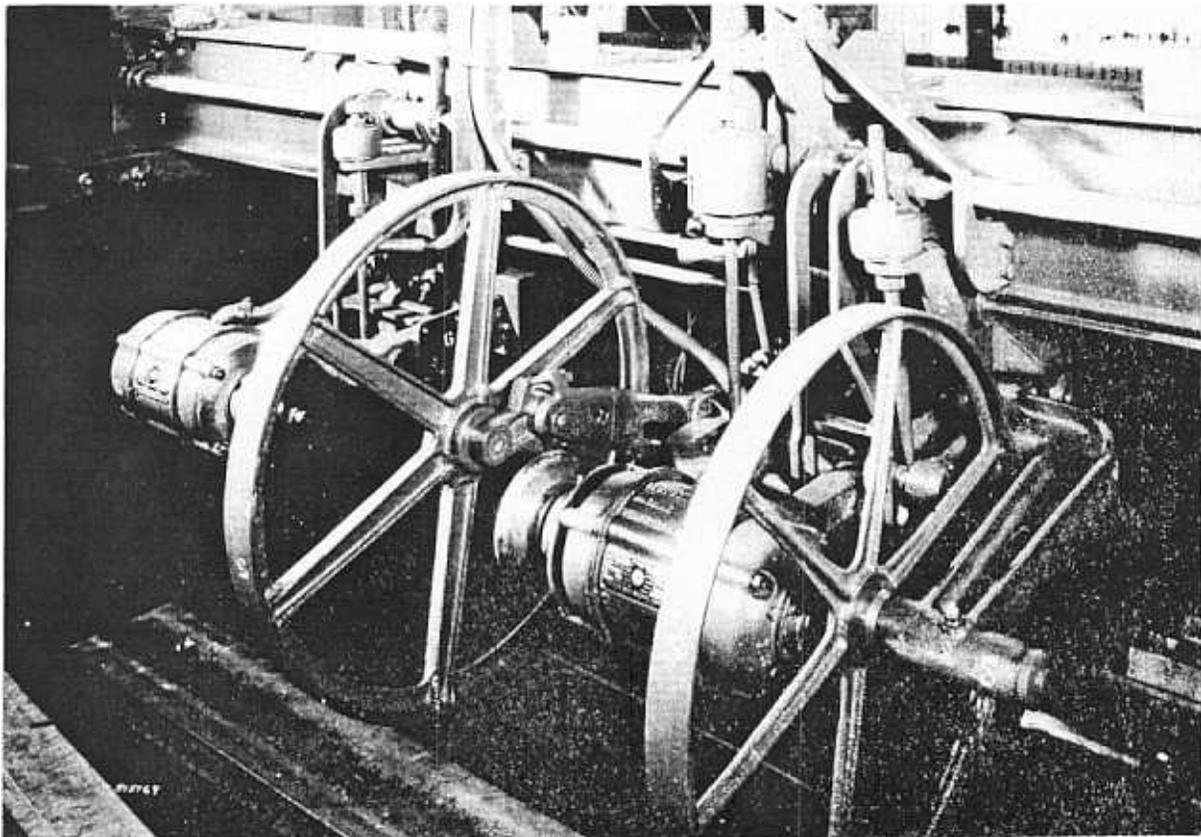


FIGURE 14

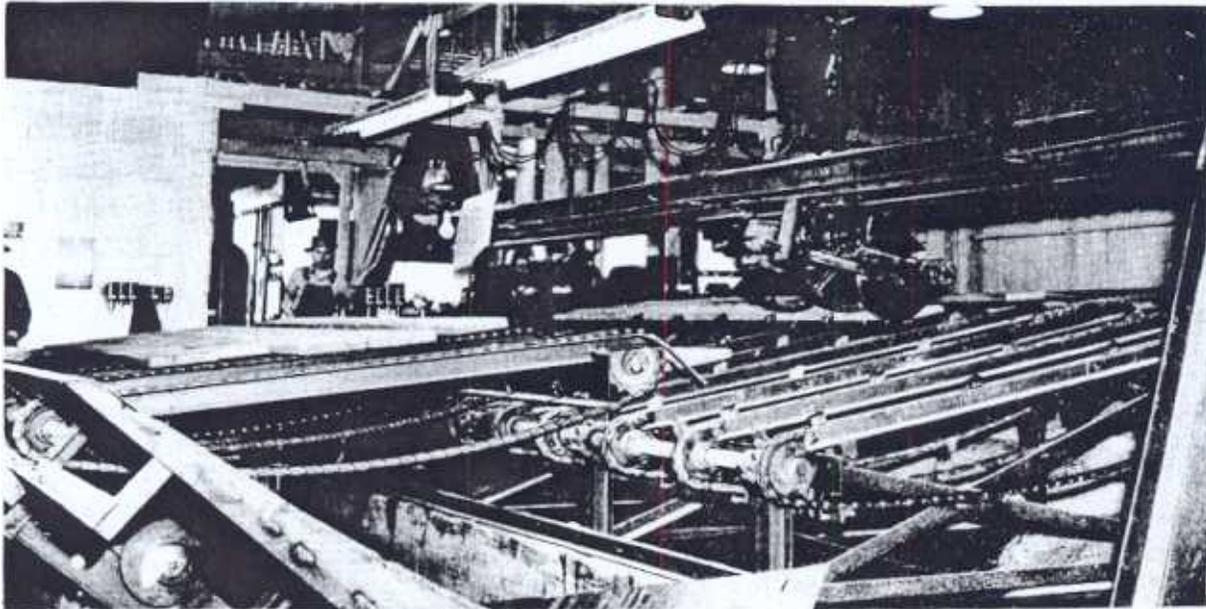


FIGURE 15

STETSON-ROSS T-40 THREE SAW DOUBLE END TRIMMER WITH MOTORIZED TRAVERSE USED FOR QUICKLY SETTING THE TWO RIGHT HAND SAWS. THE TWO ADJUSTABLE SAWS ARE 2' APART AND ARE TRAVERSED TOGETHER, ELECTRICALLY, TO ANY DESIRED SETTING ALONG THE SAW BEAM. THE 0' SAW ON THE LEFT REMAINS STATIONARY. EACH SAW HAS ITS OWN 5 HP 3600 RPM MOTOR. A STETSON-ROSS UNLOADER HOIST IS USED TO BREAK DOWN LUMBER LOADS AHEAD OF THE SAW. TRIMMED LUMBER CONTINUES AUTOMATICALLY ONTO THE PLANER FEED TABLE AND THROUGH A STETSON-ROSS 6-12-A1 PLANER AND MATCHER. IN FOREGROUND NOTE STICKER REMOVAL BELT FOLLOWING UNLOADER HOIST. INSTALLATION AT ROSS LUMBER COMPANY, MEDFORD, OREGON. 502281A

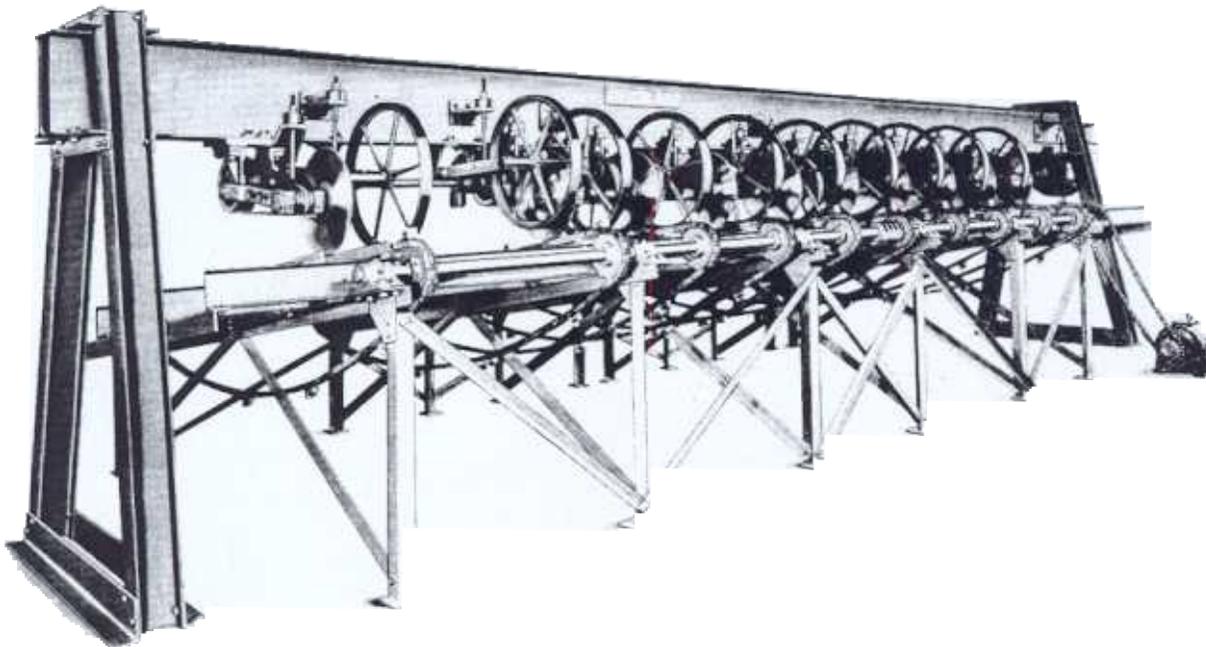


FIGURE 16

STETSON-ROSS T-30 AUTOMATIC RANDOM LENGTH TRIMMER. OUTFEED SIDE. LARGE, 28" DIA. HOLDDOWN AND LIFT WHEELS ARE A FEATURE OF THE MACHINE. THE WHEELS MAY BE ORDERED RUBBER COVERED WHEN FINISHED LUMBER IS TO BE TRIMMED. FABRICATED STEEL "A" FRAMES AND FEED CHAIN SUPPORTS ARE DESIRABLE OPTIONAL FEATURES. 515124A

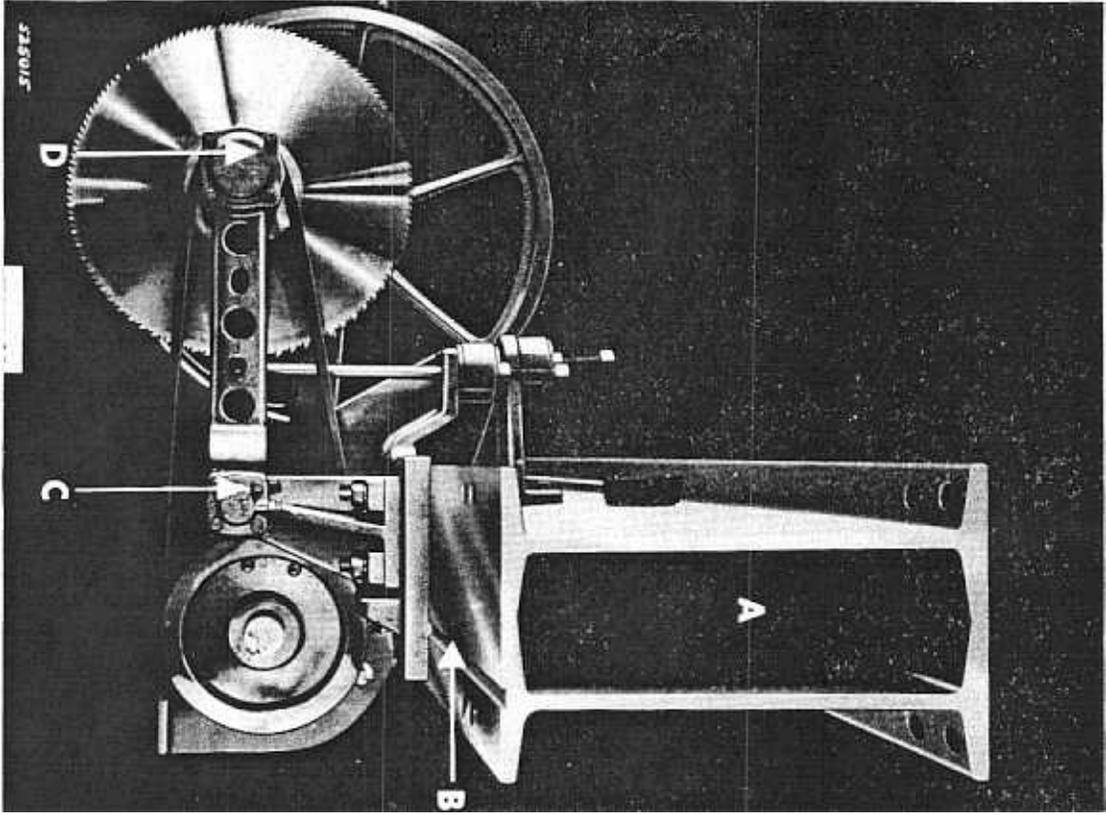


FIGURE 19

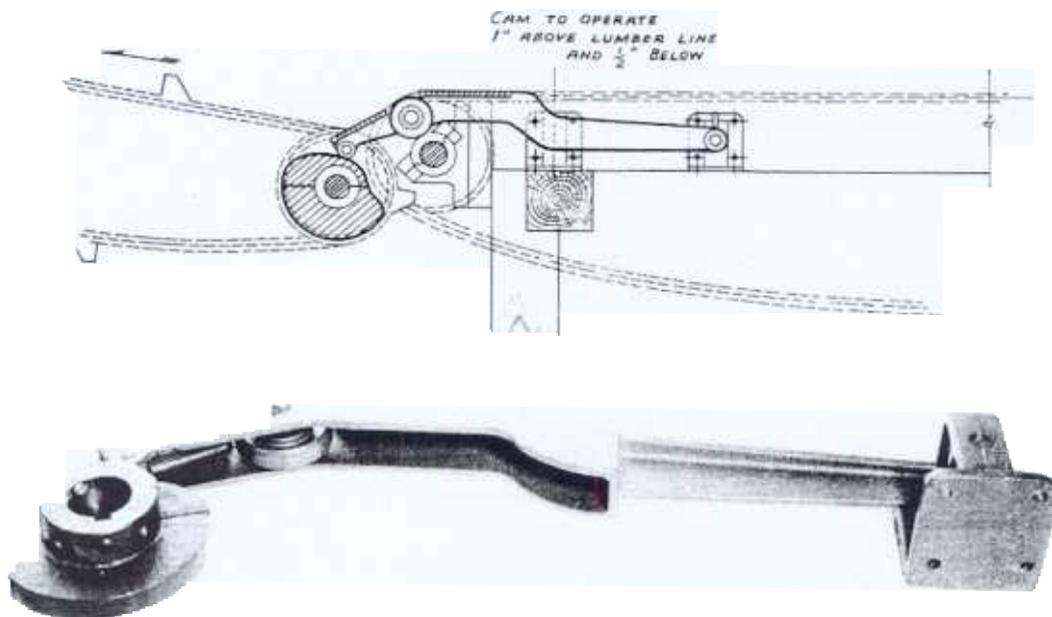
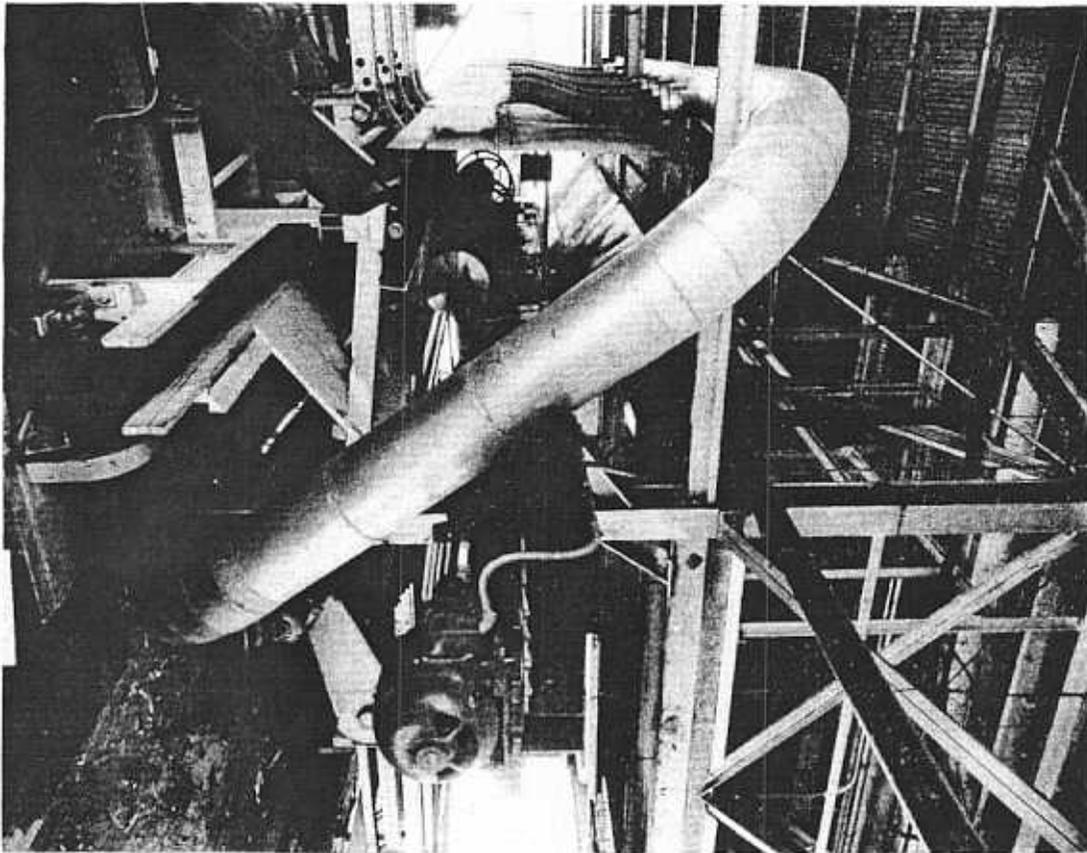
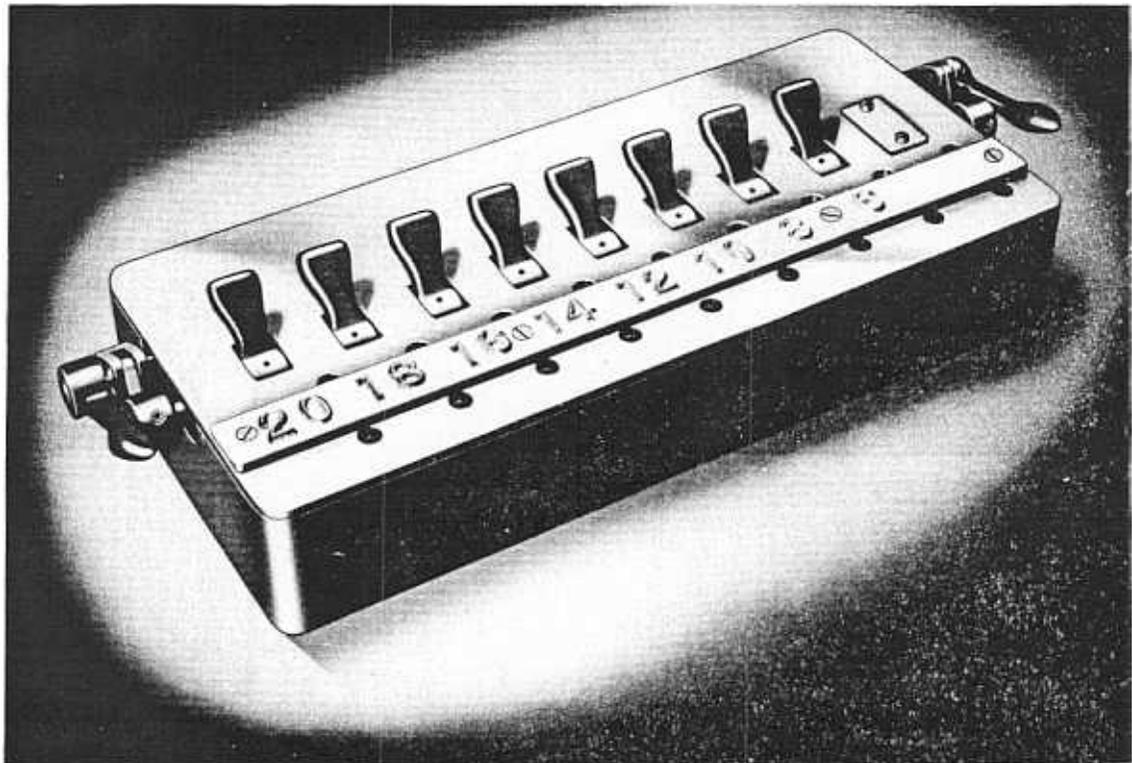
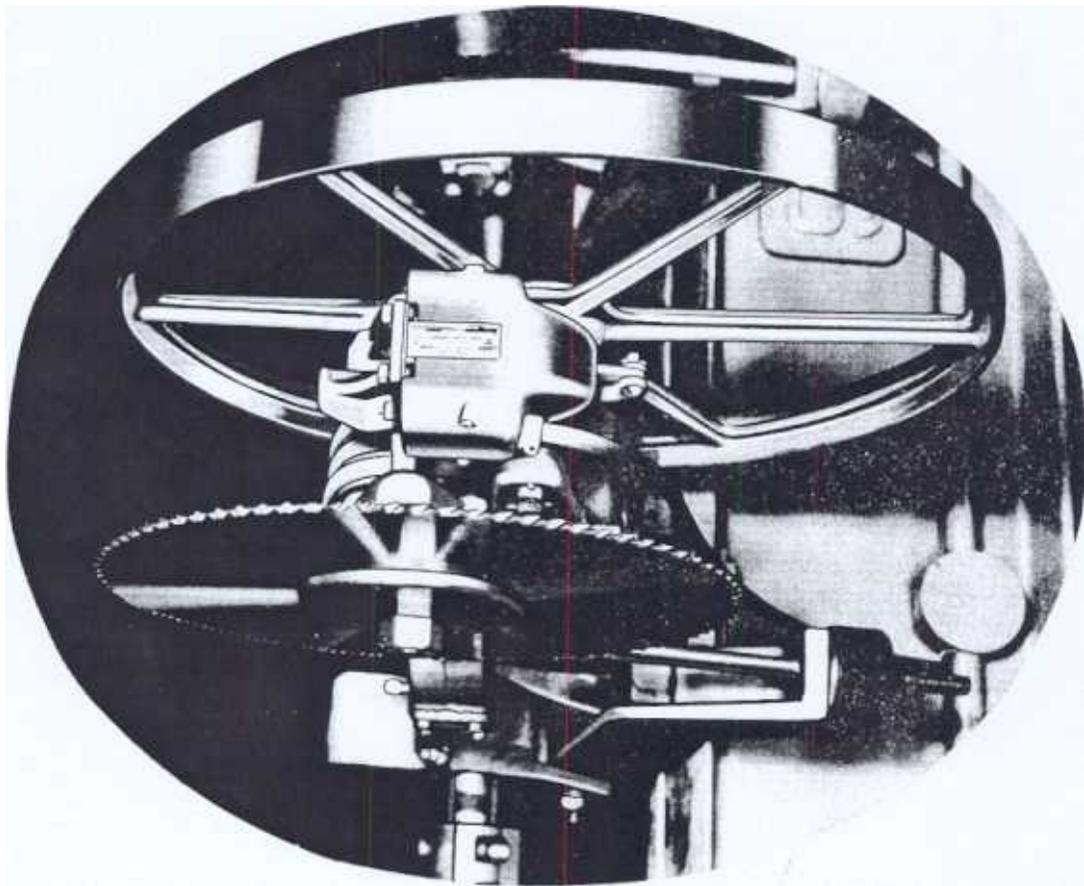


FIGURE 20

CAM LOADING DEVICE DESIGNED TO AUTOMATICALLY LOAD EACH LUG ON THE FEED CHAINS OF A STETSON-ROSS T-30 RANDOM LENGTH TRIMMER. THE CAM FOLLOWERS, OPERATING ON THE TAIL SHAFT OF THE FEED CHAINS, RISE TO HOLD BACK THE FLOW OF LUMBER TO THE CHAINS AND LOWER TO PERMIT THE NEXT BOARD TO FALL ON THE TRIMMER FEED CHAINS. THE ROLLER WHEEL AIDS THE MOVEMENT OF LUMBER TO THE FEED CHAINS. REFERENCE PRINT #T-153 FOR FURTHER DETAILS. #515014A



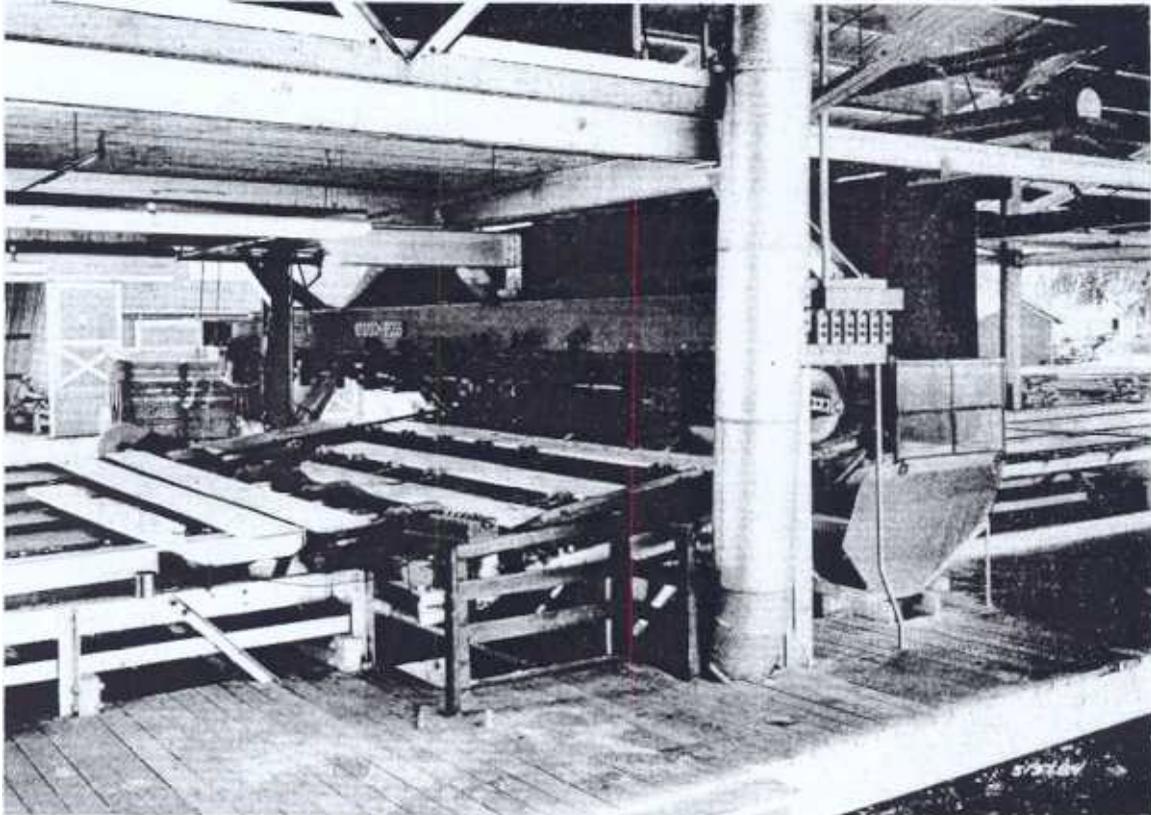


FIGURE 23

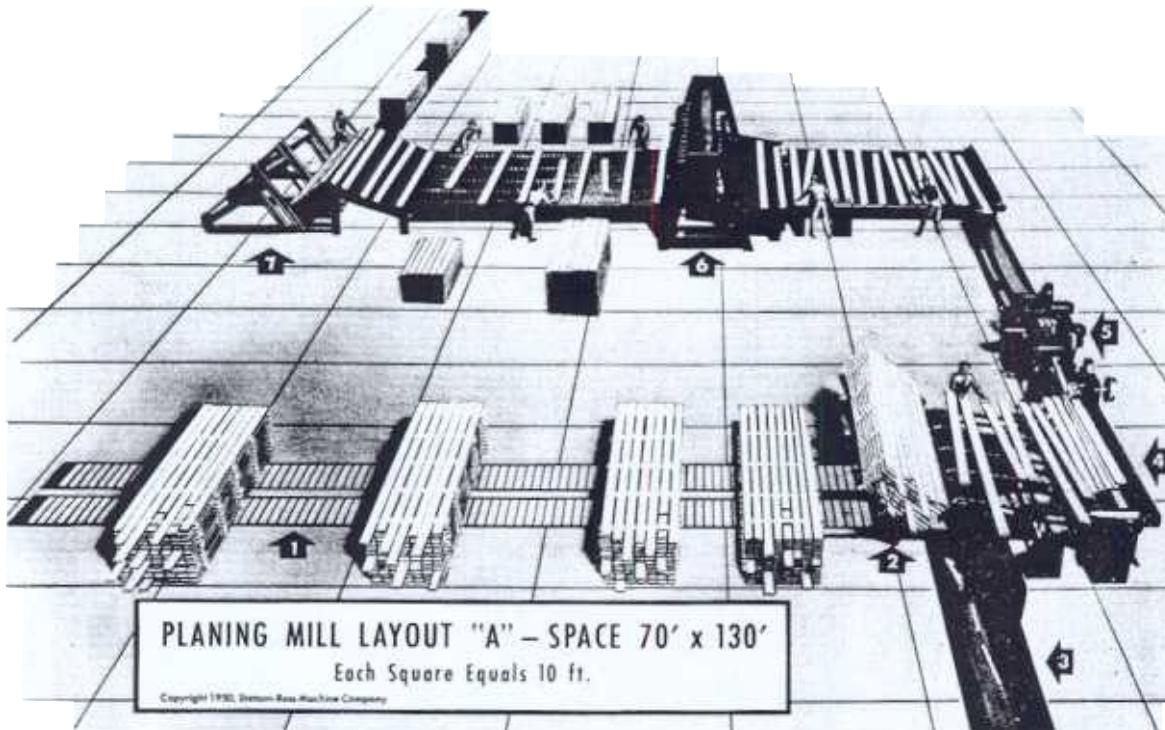
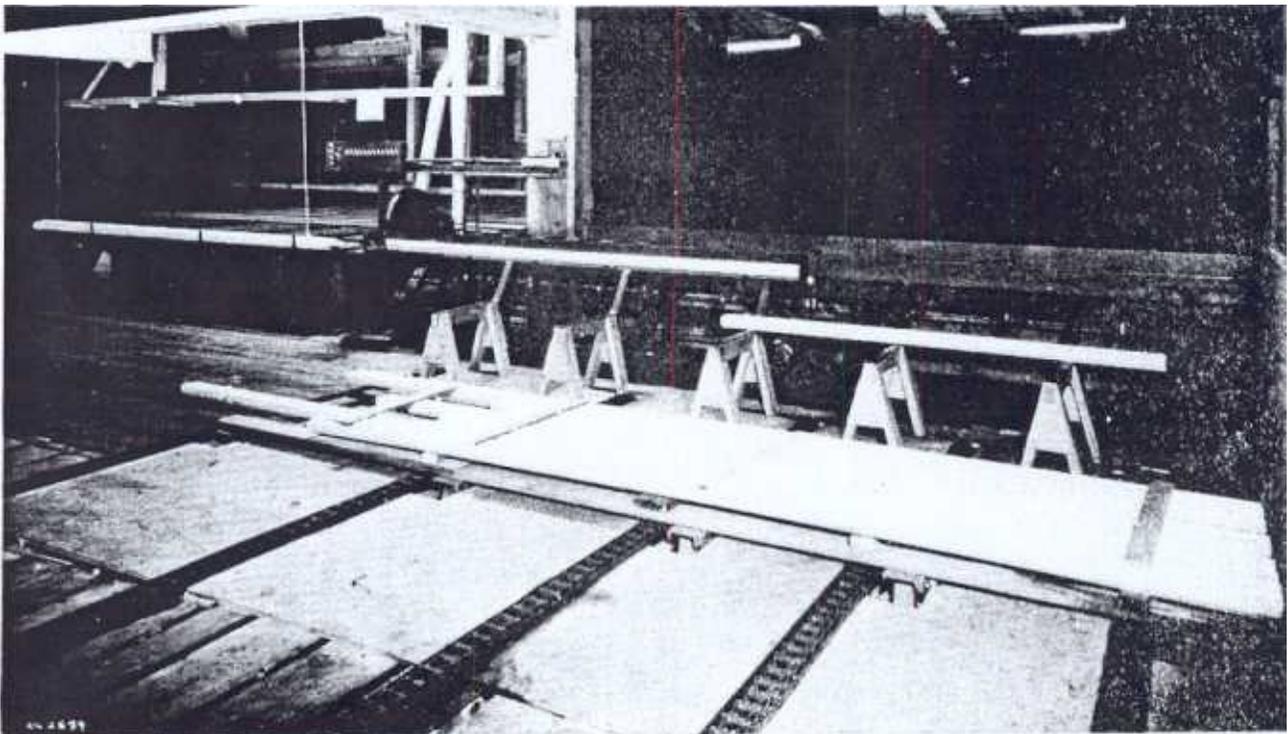
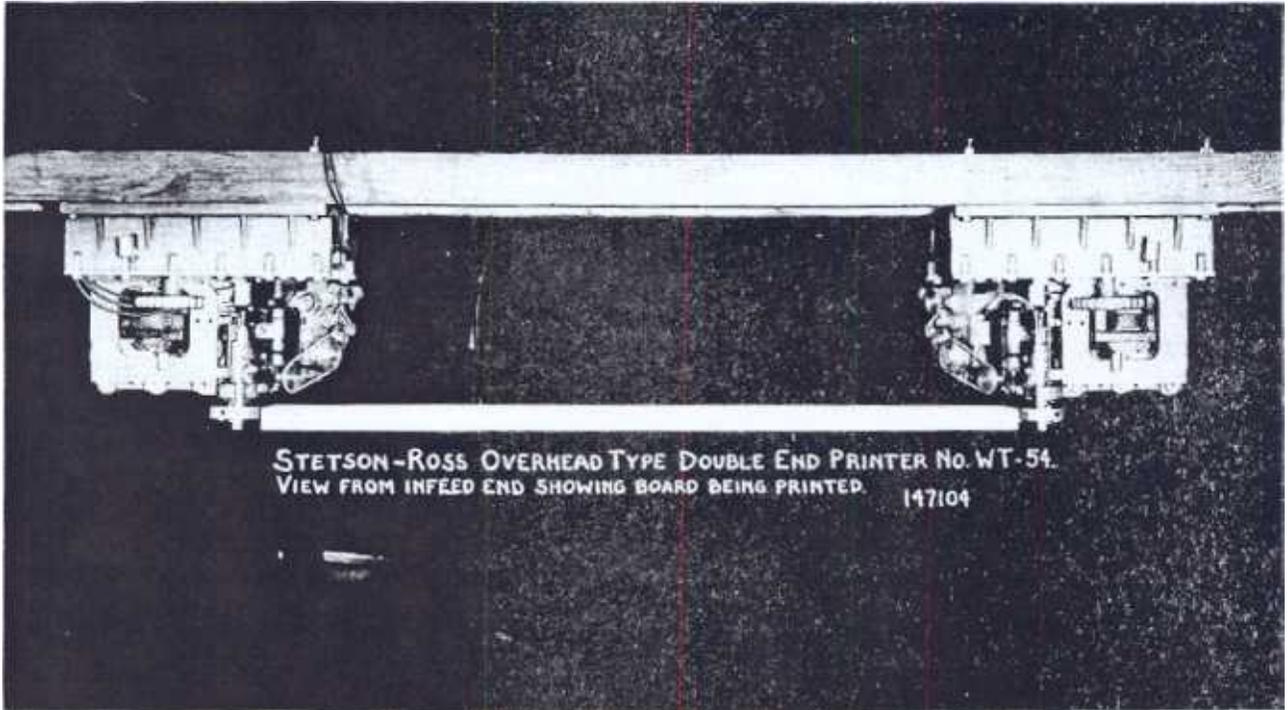
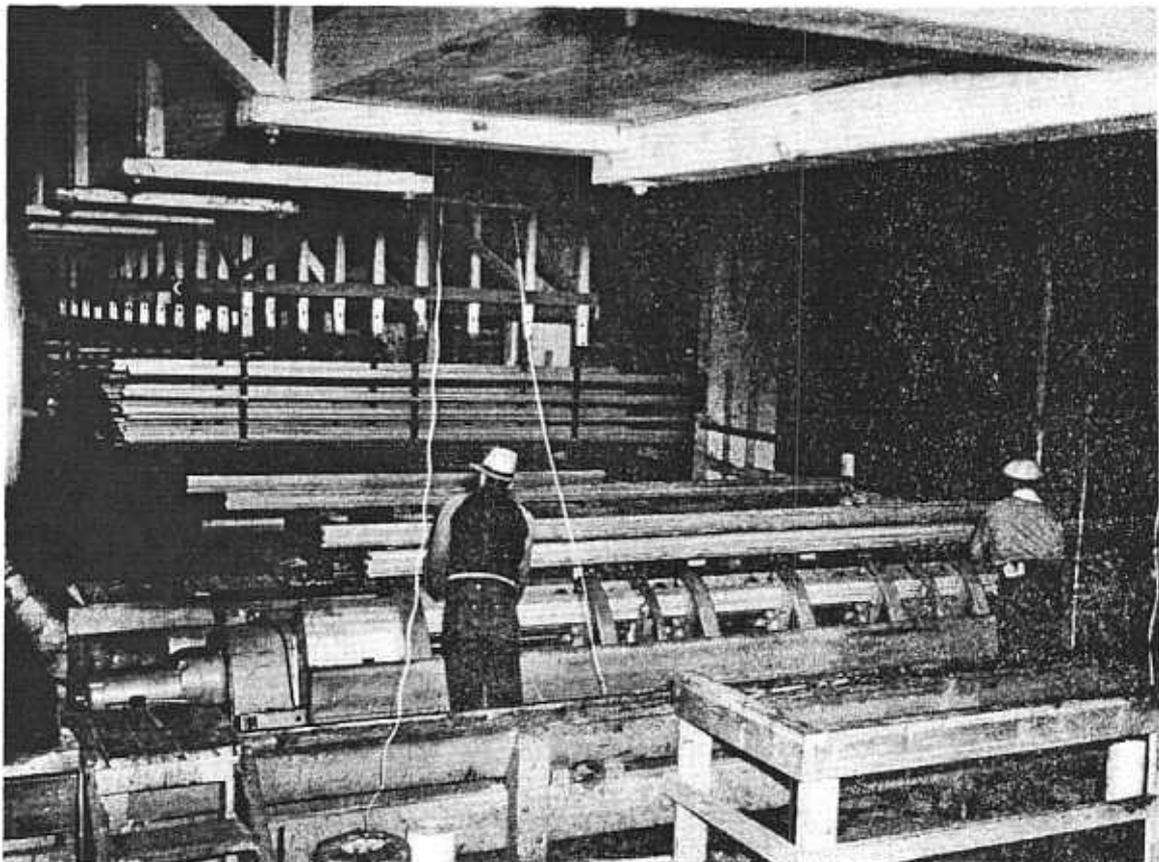
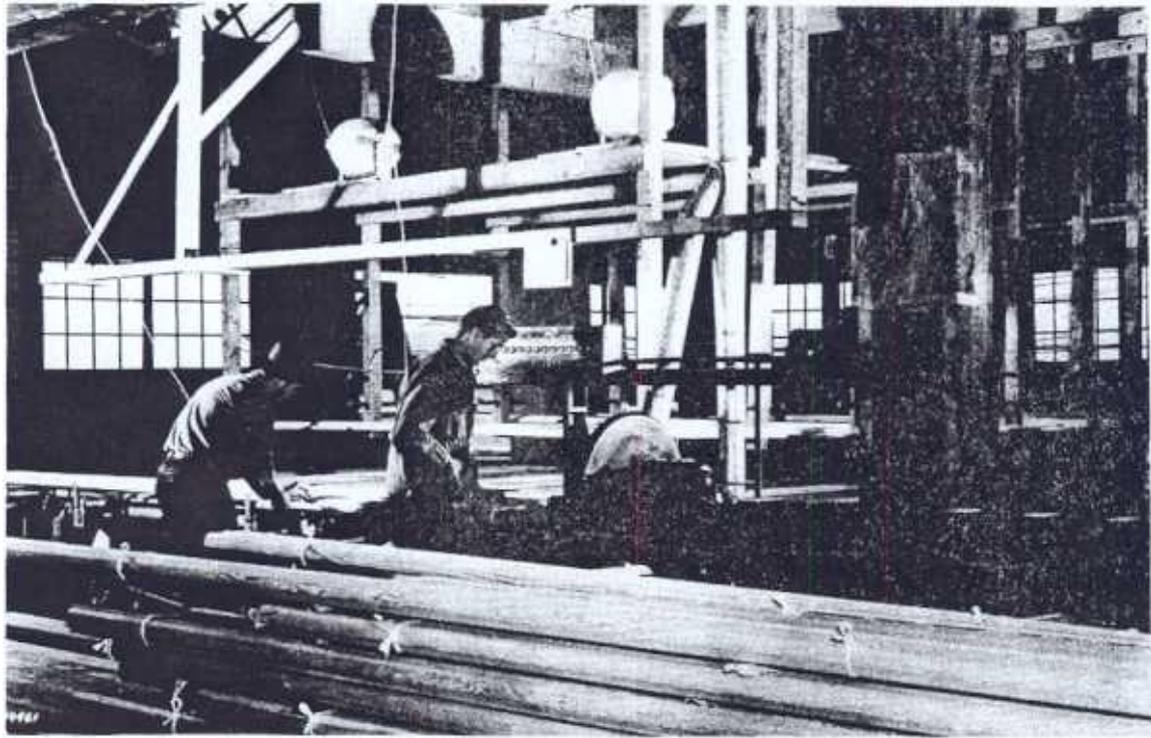


FIGURE 21.

STETSON-ROSS PRODUCTION EQUIPMENT SHOWN: (1) 703E TRAVELING APRON DECK CONVEYOR, (2) 603E TILTING UNLOADER HOIST, (3) STICKER AND BUNK REMOVAL CONVEYOR, (4) 511E FEED TABLE, (5) 6-10-A1 PLANER AND MATCHER, (6) T-30 SELECTIVELY AUTOMATIC RANDOM LENGTH TRIMMER, (7) 603RE TILTING RELOADER. 515093





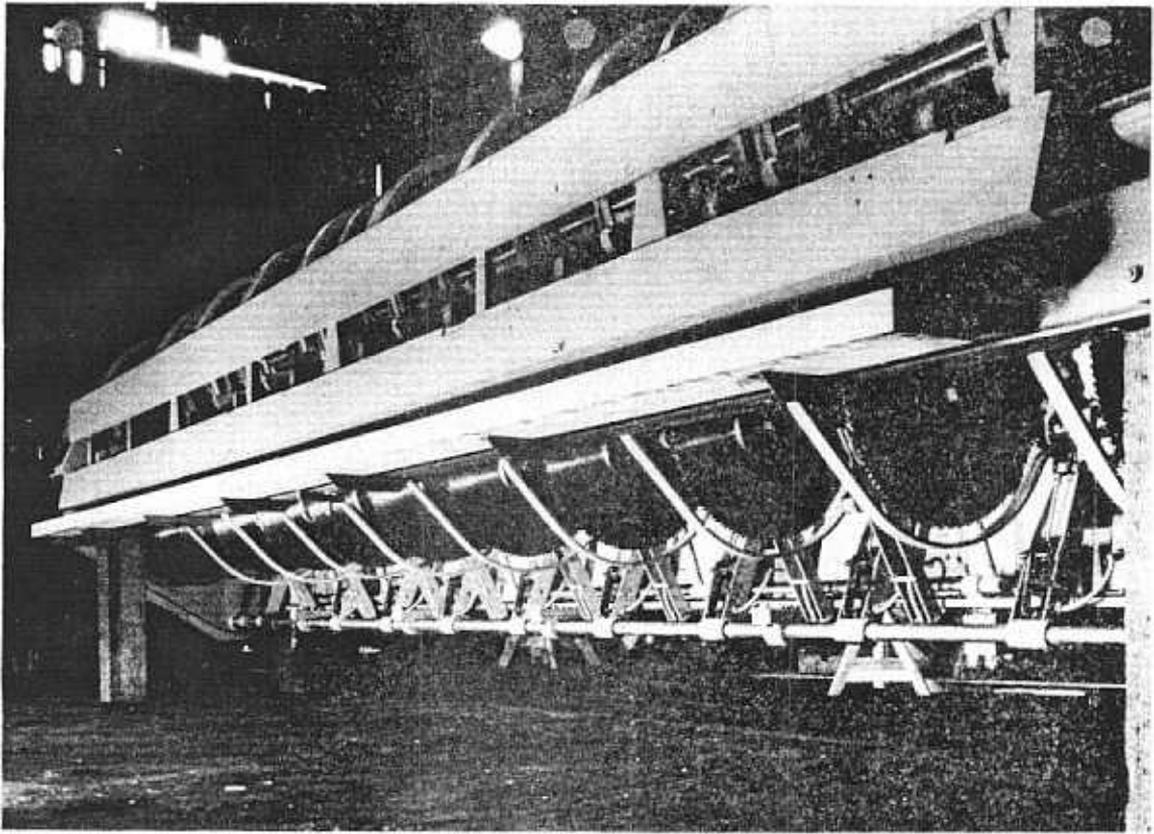


FIGURE 29

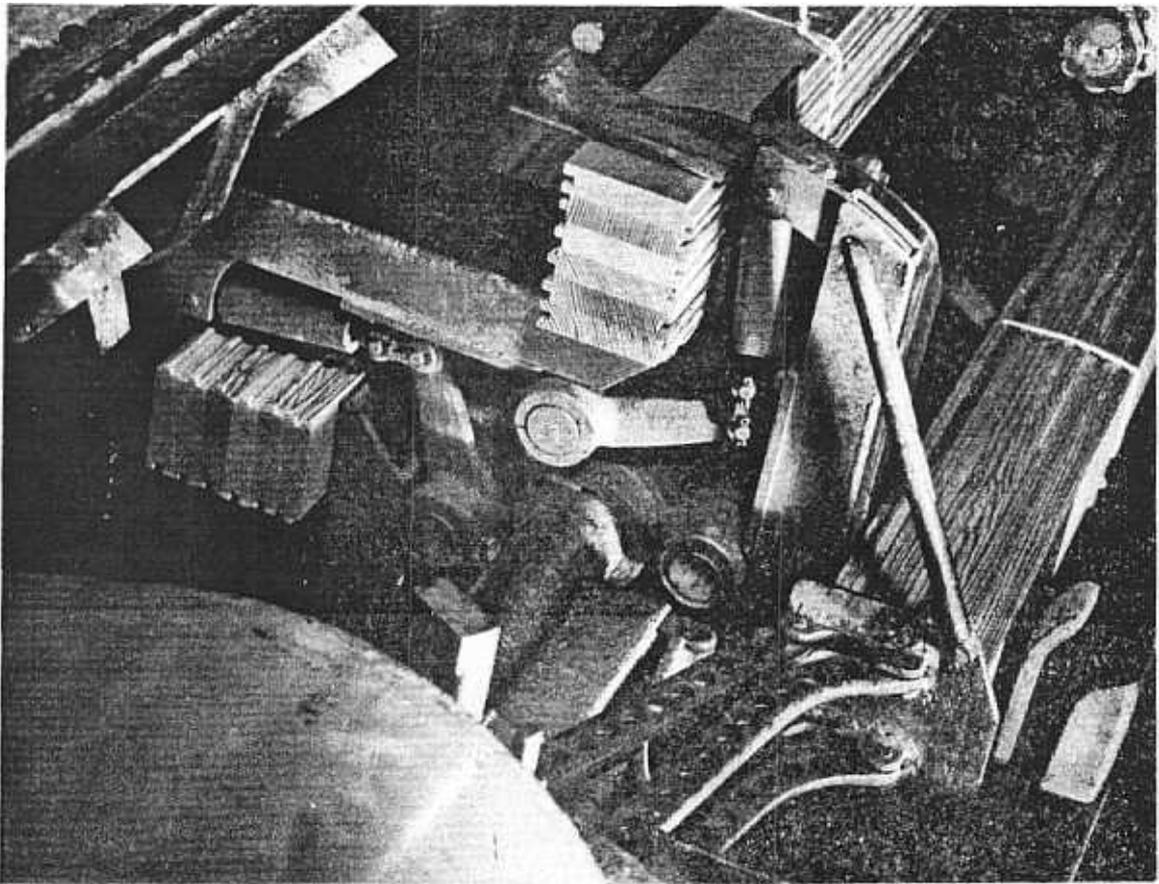


FIGURE 30

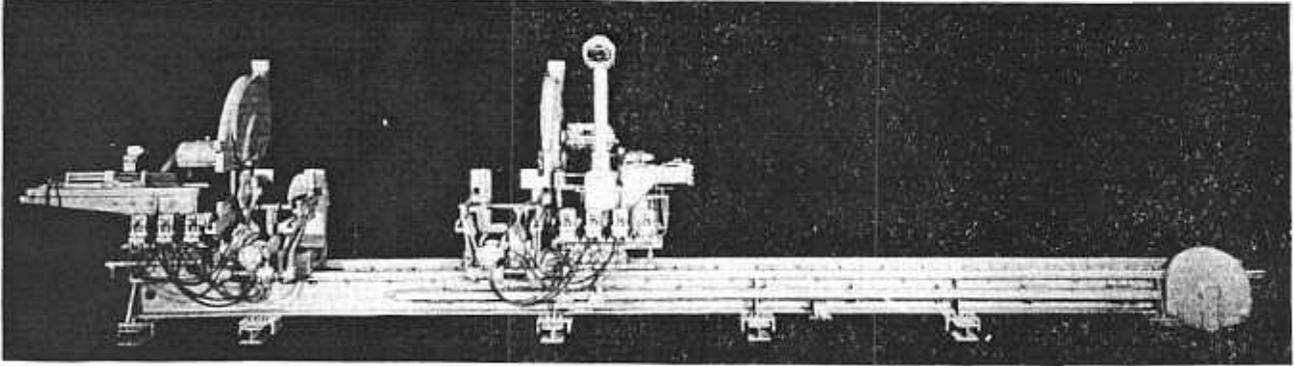


FIGURE 31

STETSON-ROSS WT65 SMOOTH-END BUNDLE TRIMMER. INFEEED SIDE. THE MOVABLE SAW UNIT IS SHOWN TRAVERSED TO AN INTERMEDIATE BUNDLE LENGTH. THE TRAVERSE MOTOR ON THE RIGHT END OF THE TRACK IS CONTROLLED BY LIMIT SWITCHES LOCATED AT ALL THE DESIRED BUNDLE LENGTHS. 515103A

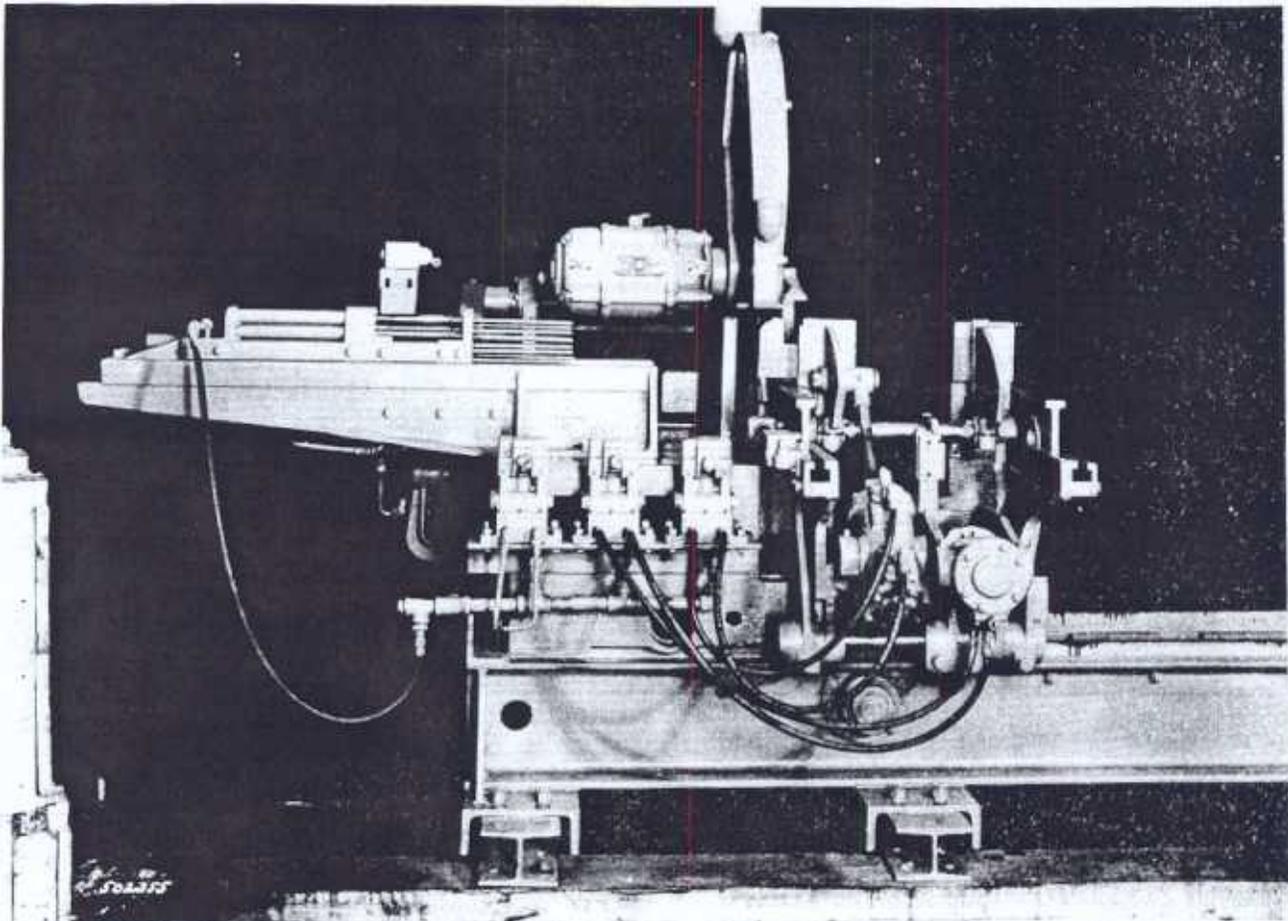


FIGURE 32

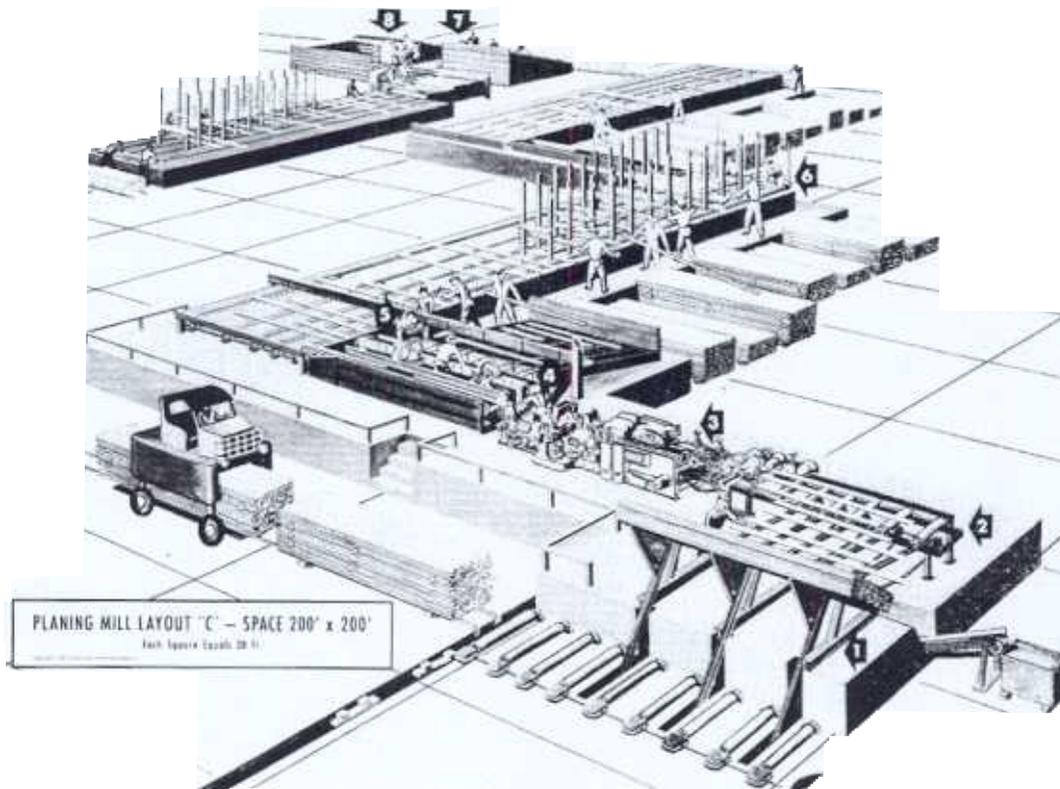
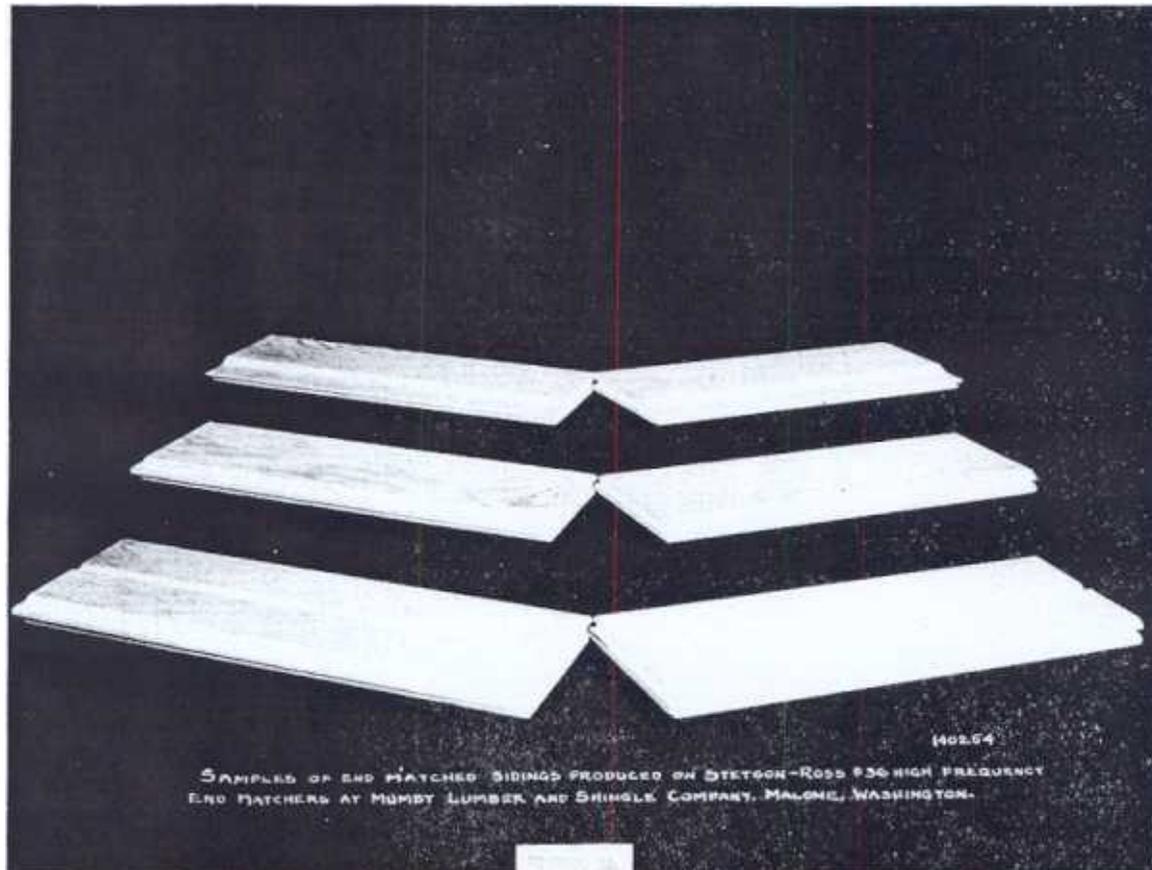
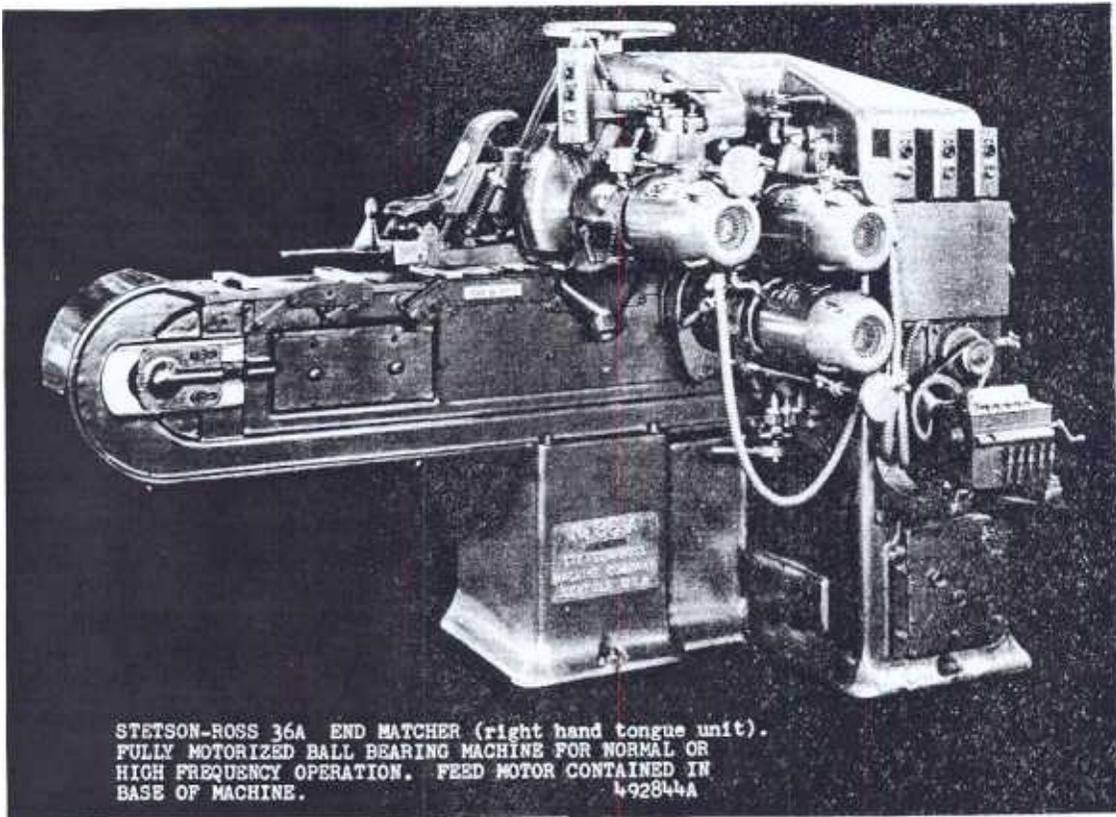


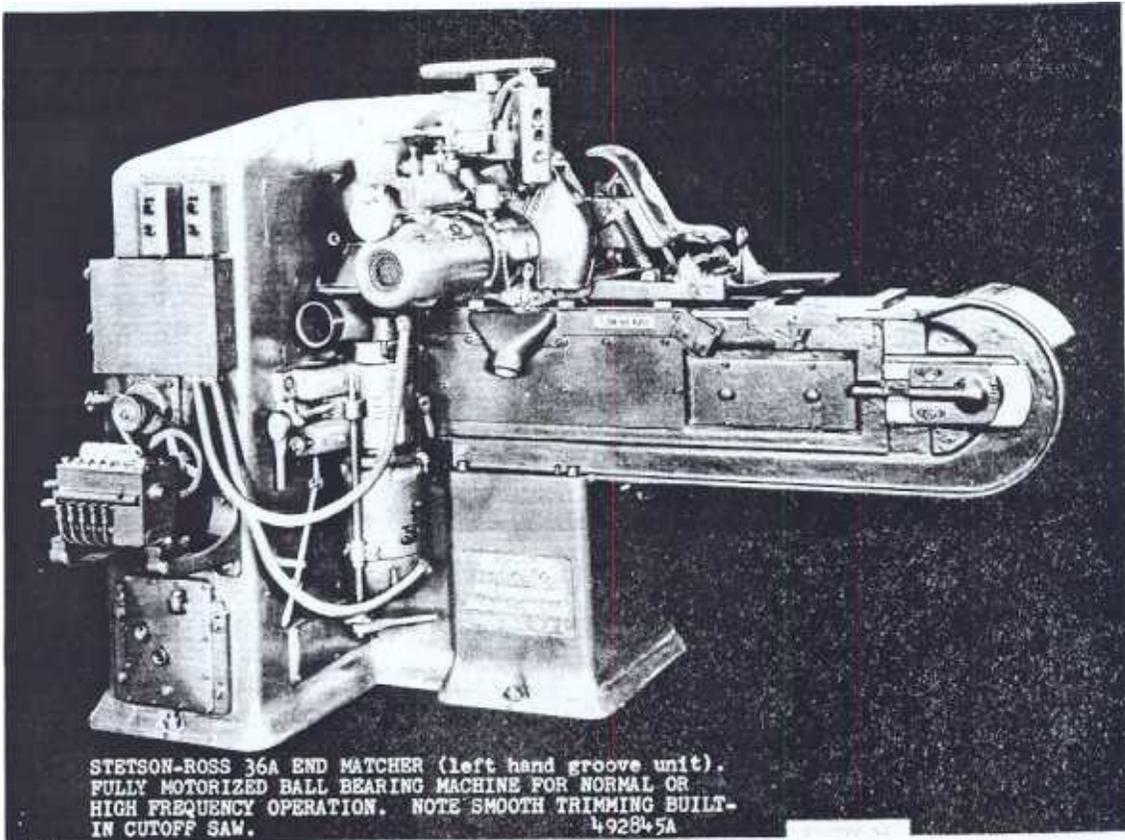
FIGURE 33

STETSON-ROSS PRODUCTION EQUIPMENT SHOWN: (1) 603E TILTING UNLOADER HOIST, (2) 505AE DOUBLE PINEAPPLE FEEDING TABLE, (3) 202 TWO-WAY THICKNESSING PLANER AND MATCHER, (4) TWIN T-18 TRIMSAWS, (5) SINGLE T-18 TRIMSAW, (6) NO. 65 AUTOMATIC BUNDLE TRIMMER, (7) TM-3 SAW ARBOR MOTOR, (8) 36A END MATCHERS. 515095

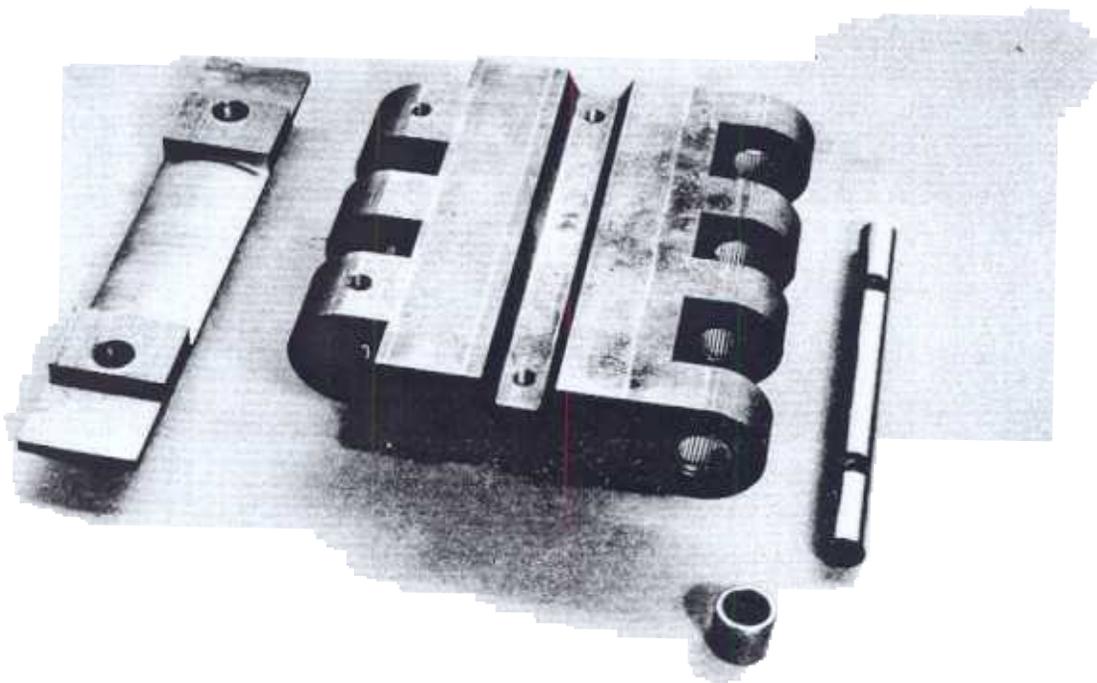
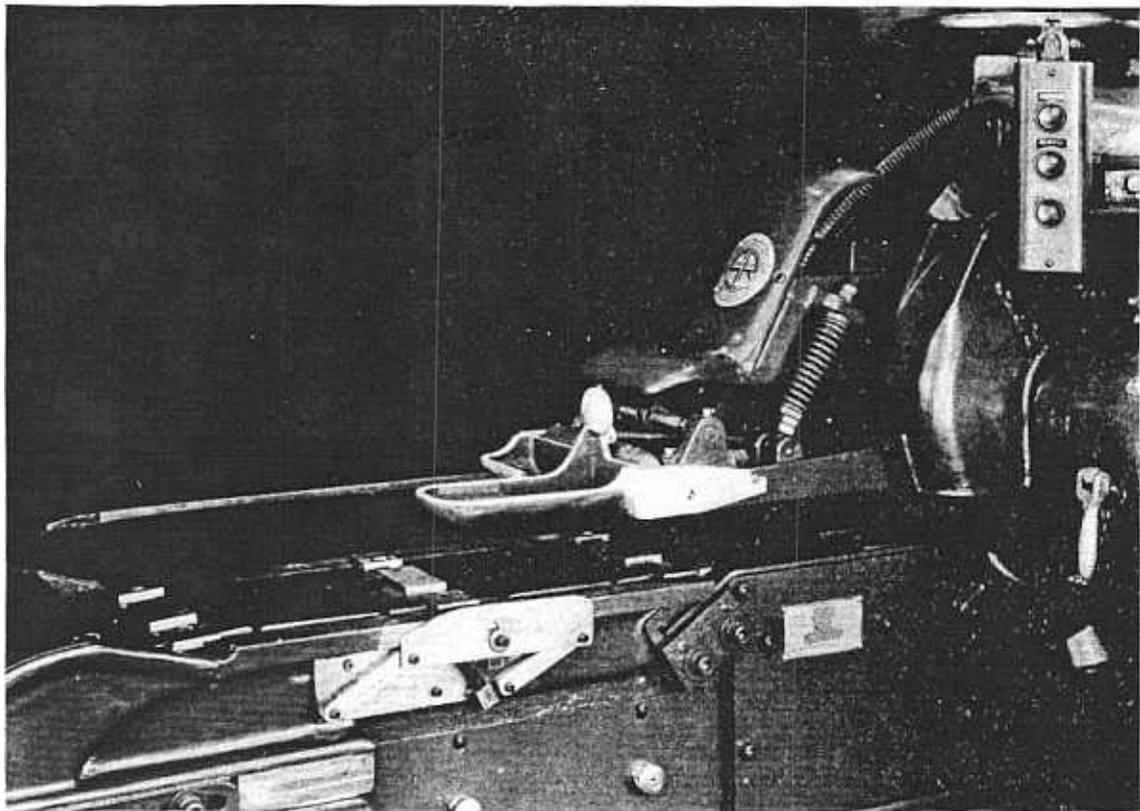




STETSON-ROSS 36A END MATCHER (right hand tongue unit).
 FULLY MOTORIZED BALL BEARING MACHINE FOR NORMAL OR
 HIGH FREQUENCY OPERATION. FEED MOTOR CONTAINED IN
 BASE OF MACHINE. 492844A



STETSON-ROSS 36A END MATCHER (left hand groove unit).
 FULLY MOTORIZED BALL BEARING MACHINE FOR NORMAL OR
 HIGH FREQUENCY OPERATION. NOTE SMOOTH TRIMMING BUILT-
 IN CUTOFF SAW. 492845A



FIGURE

STETSON-ROSS, 36A. END MATCHER
TONGUE UNIT, SHOWING MOTOR
DRIVE SYSTEM, AUTOMATIC METERED
OILING FOR FEED BED, PUSH
BUTTON CONTROLS AND OUTBOARD
FEED CHAIN SYSTEM, OPERATED
FROM SELF CONTAINED GEAR DRIVE.
PRECISION MACHINING AND HEAVY
DURABLE CONSTRUCTION ARE
FEATURED. (NOTE: HALF OF FEED
MOTOR ACCESS DOOR REMOVED).

48222A

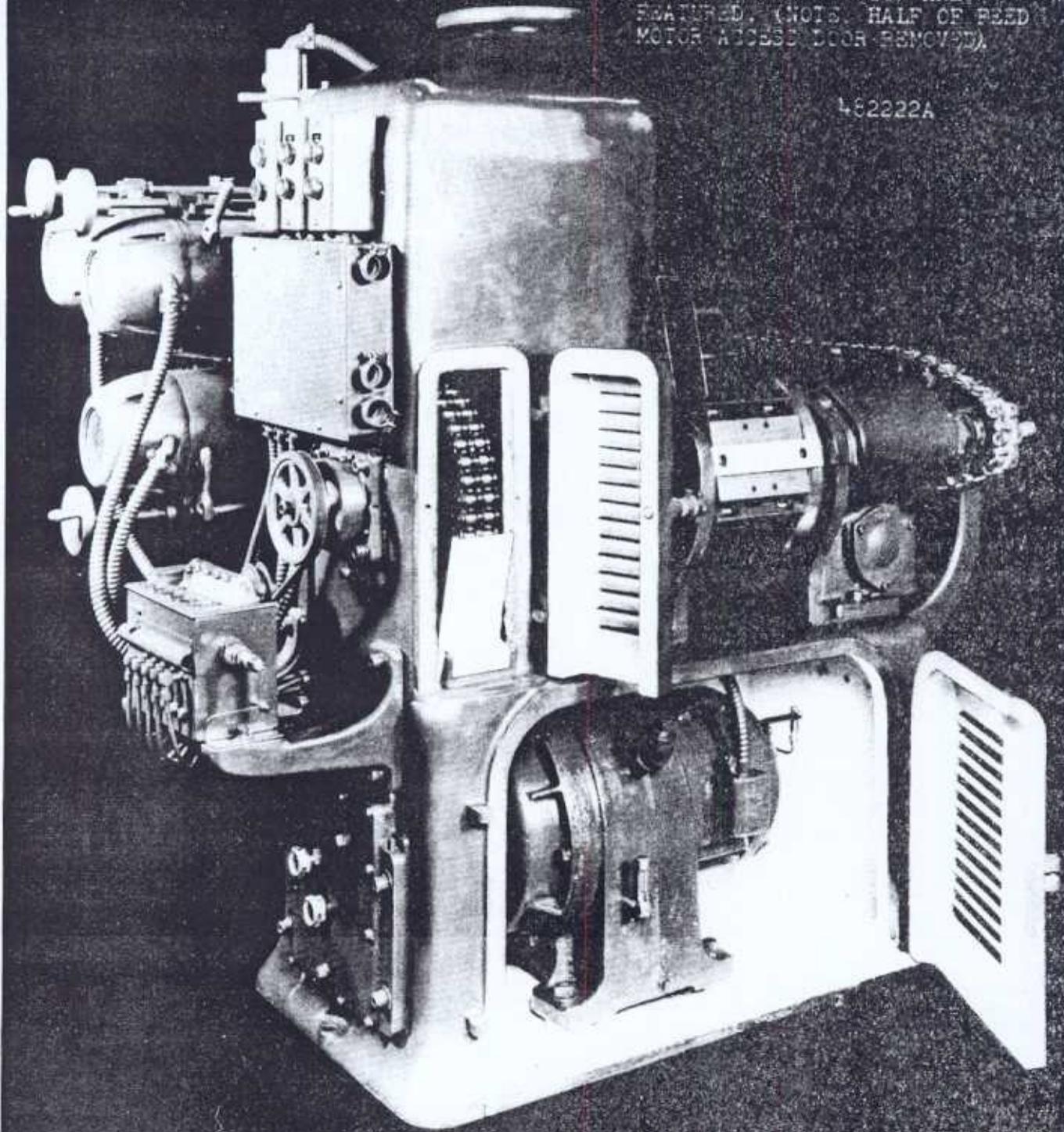


FIGURE 39