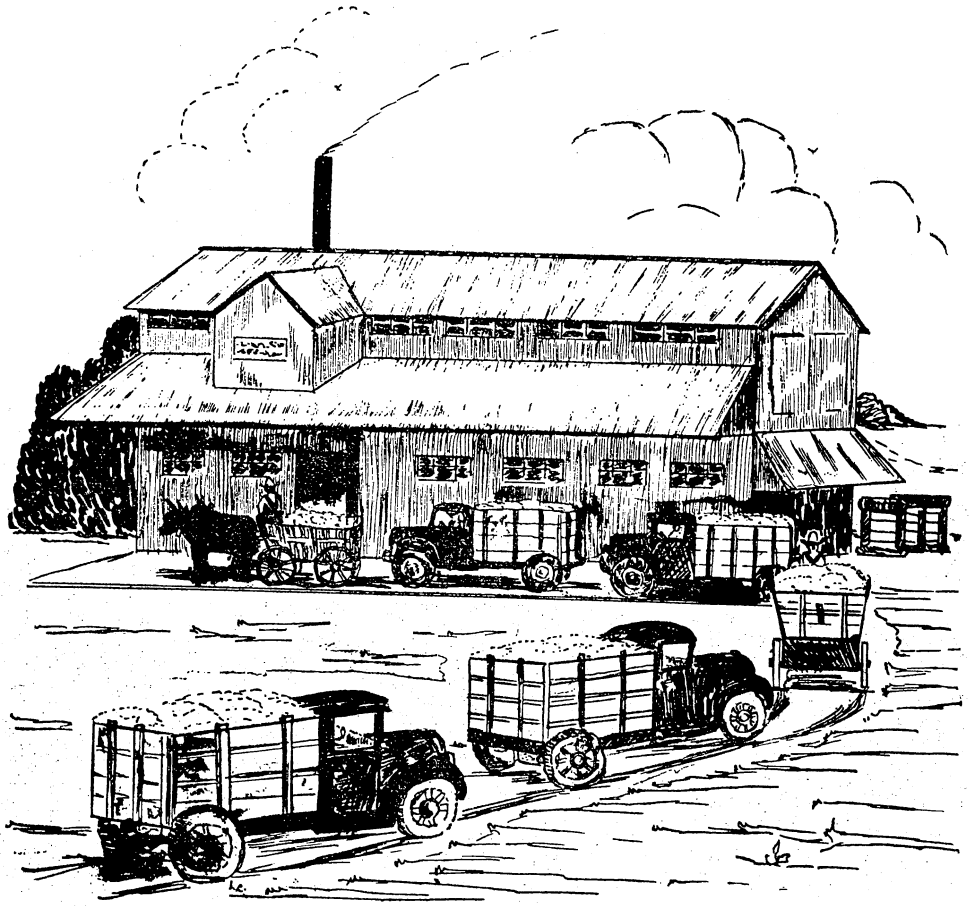
CIRCULAR 508 JUNE, 1949

THE GINNING PROCESS



EXTENSION SERVICE
OKLAHOMA A. & M. COLLEGE
Shawnee Brown, Director
STILLWATER, OKLAHOMA

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A Dozen Points To Remember

1. Maintain loose roll at all times.

2. Operate saws at 650 to 700 R.P.M.

3. When 12-inch gin saws are reduced 1/16 inch in diameter, the capacity is lowered twenty percent.

4. Never mix new and worn saws on the same cylinder.

5. Set picker roller as far as possible from huller ribs without loss of cotton.

6. Maintain correct pitch and tooth shape when sharpening saws.

7. Maintain rib spacing of 1/8" at point where saw enters.

8. Brush bristles should mesh into saws not more than full depth of tooth.

9. Brushes should have a tip speed of 6,666 feet per minute.

10. Air-blast nozzles should be kept free of all obstruction.

11. A mouth pressure of 12 to 14 inches water pressure should be maintained on air-blast nozzles.

12. Keep safety locks and clamps in place at all times.

Gin Saw and Rib Relations

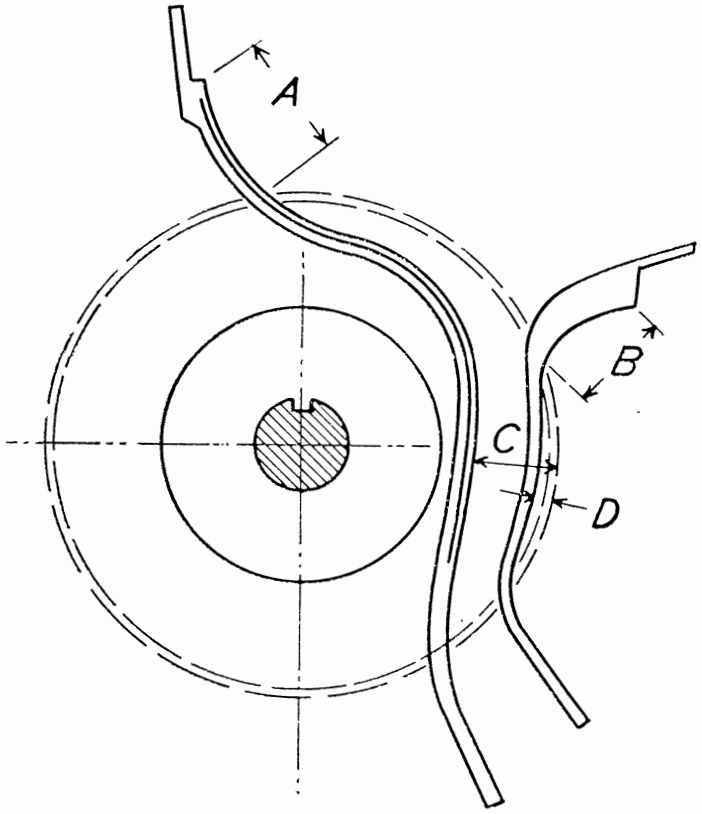

TABLE 1

Manufacturer	Model Name or Number	A (inches)	B (inches)	C (inches)	D (inches)
Centennial	M-49	2 9/16	2 5/16	2 1/16	9/16
Continental	F-3	(1) 4 7/16	1 3/8	2 1/8	5/8
Gullett	Model "H" Rib	1 1/4	(2)	2	1/2 to 9/16
Hardwick-Etter	1937 to 1949	1 3/4	(3)	(2)	1/4 to 3/8
Lummus	Double Moting	1 1/4	1 1/16	2 1/4	1/2 to 9/16
Murray	All	1 3/4 to 2	(2)	(2)	3/16 to 1/4

(1) From upper end of rib.
(2) Determined by other settings shown.
(3) Special setting—see factory instruction book.
The manufacturer should be consulted about other models.

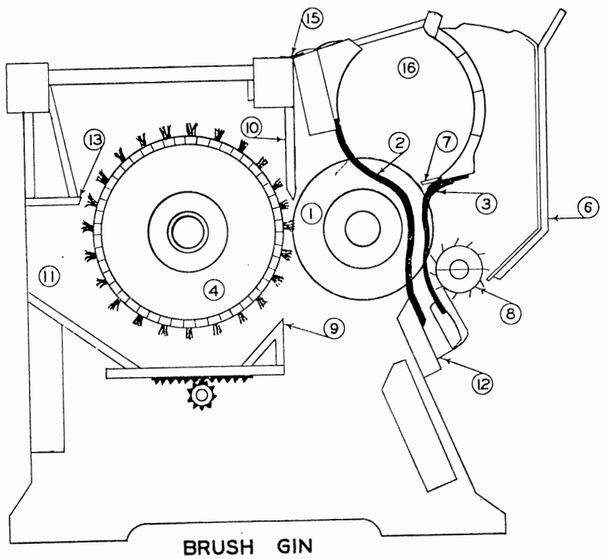

FIGURE 1

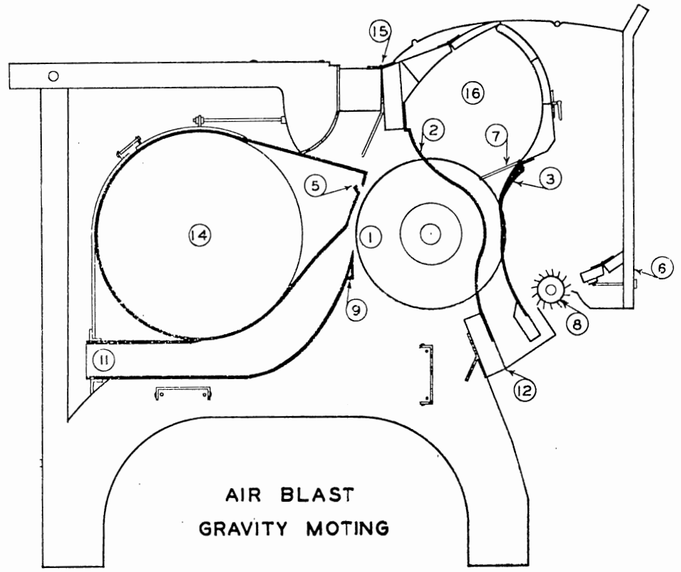

FIGURE 2

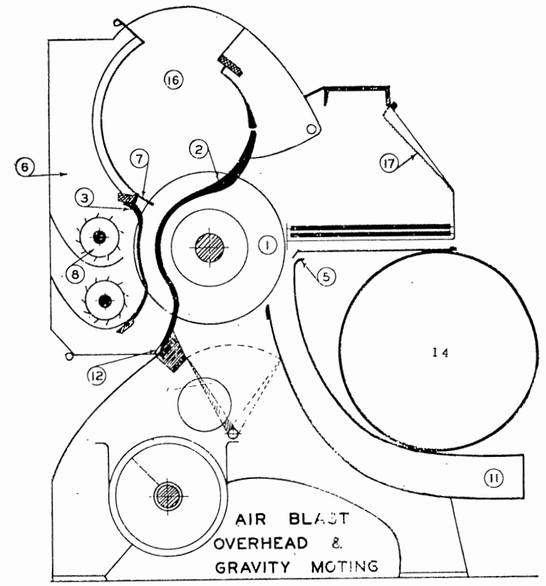

FIGURE 3

TYPES OF GIN STANDS

Two principal types of saw gins are in use today—air-blast and brush. Each type includes plain front designs in which the seed cotton is fed directly into the roll box, and huller front designs in which the seed cotton is fed to picker rollers (8) designed to extract burs and trash. In the huller gins, the gin saws (1) draw the seed cotton from the picker roller of the huller breast through the huller ribs (3) into the roll box (16). Figures 1, 2 and 3 show cross sections of three huller gins.

HULLER FRONT GINS

Double-rib huller fronts (6) give protection to the gin saws by eliminating foreign matter like burs, hulls, and leaf stems from the roll box. Single-rib plain gins are now seldom found. By keeping foreign matter from the seed roll the ginned lint will not be contaminated as is likely to happen when the gin saws have to cut through a trash-laden seed roll in the ginning breast or roll box. On rough trashy cotton a huller gin will give the best results when the picker roller is set as far away from the huller ribs as possible without loss of cotton. This adjustment allows a free discharge of foreign matter. If the trash does not discharge readily from the huller front, the gin saws drag in parts of it, the ginning capacity is reduced, chokages follow, and a poor grade of lint is turned out. Then the part of the trash drawn into the roll box that does not go with the lint is discharged with the seed and lowers the value of the seed.

METHODS OF MOTING

Two gins (Figs. 1 & 2) are of the type that "mote by gravity"; that is, they cast off motes and some foreign matter into the spaces below the saws. Other efficient and economical designs of gins mote by centrifugal force, (Fig. 3), discharging the motes overhead between the back of the ginning ribs (2) and the brush (4) or the air-blast nozzle (5).

RATE OF FEEDING

The rate at which seed cotton is fed to the gin saws has an important influence on the quality of the lint produced. The cotton farmer pays dearly when he insists on rushing his cotton through the gin. Both the air-blast and brush gins give a smoother and more valuable sample when the gin stands are fed so as to obtain a loose seed roll. The rate at which the seed cotton should be fed to the gin saws depends on the amount of moisture in the seed cotton, the length of the staple, the size and fuzziness of the seed, and other physical characteristics of the cotton. Long-staple cotton should be fed and ginned more slowly than short-staple cotton, and green or damp cotton more slowly than dry cotton. A loose seed roll produces a smoother sample than a tight seed roll. A ginner who is feeding the gin stands at the lowest notch and still getting a rough sample can often improve it by slowing down his feeder drive. Setting the seed board (7) wide open also helps because it permits a good discharge of seed and thus contributes to a loose seed roll.

SEED-ROLL DENSITY

Samples ginned with a loose seed roll average from one-third to almost a full grade better than those ginned in the same way except with a tight roll. This variation is largely due to the staple length and the moisture content of the cotton. On some individual cottons the resulting lint is sometimes two full grades better. Using a tight seed roll not only lowers ginning preparation, but also puts the cotton in such a shape that the color and foreign matter designations may be lowered. Loose-roll ginning is the proved method for the most successful cotton gin operation; therefore, a tight seed roll should always be avoided. Using a loose seed roll has several advantages from a mechanical point of view because it requires less power, causes less wear and tear on gin saws and ribs, and reduces chokages in huller fronts, ribs, etc.

GIN-SAW SPEED

Gin-Saw speed is secondary to roll density in its effect on the quality of lint. It is advisable to operate gin saws between 650 and 700 r.p.m. [1]

MOTE-BOARD ADJUSTMENT

The mote board (9) should be so adjusted that the undesirable substances commonly known as motes, as well as other foreign matter in the form of leaf trash, seed coat fragments, etc., can be readily expelled from the lint without loss of good fibers. It is good practice to observe the moting action of the gin and keep the mote board set to suit the cotton as the season orogresses. Check adjustments by examining the press sample for motes and by observing the material cast off at the moting position.

The construction and the means for adjusting mote boards are varied, depending on the type and make of the gin stand. Brush gins are usually provided with movable mote boards placed below the brush in a horizontal or inclined position to form an extension to the bottom of the gin flue connection (11). Air-blast gins usually have the equivalent of mote boards in the lower lip of the gin flue, which is located a few inches below the air-blast nozzle. Gins that mote by centrifugal force do not have mote boards, but may have adjustable devices (17) of various kinds so that the moting can be somewhat regulated.

SAWS AND RIBS

Best ginning results are obtained when the saws [2] are full 12-inch diameter in size. After gin saws have been reduced 1/16-inch in diameter by sharpening and ginning wear, their capacity may drop as much as 20 percent, and no known adjustments in saw position can be made to overcome it. The average life of a typical 80-saw cylinder, within the above 1/16-inch diameter reduction is 2,000 bales. In other words, the saws on a 4-80 gin should be changed every 8,000 bales, or when the saws become 11-15/16-inch diameter. New and worn saws should not be mixed on the same cylinder. Maintain the correct pitch and tooth shape when sharpening saws. For correct pitch the leading edge of the tooth should parallel the face of the rib or the point should slightly lead the throat as it passes between the ribs. It is not advisable to side dress the teeth heavily, nor to bring them to a sharp needle point. Rotary side filers often ruin the gin saw teeth by operating under too much pressure and consequently dressing the tooth sides unnecessarily heavy. Clean edges without sharpness or metal burs, and with chisel shape points half the thickness of the saw have given the best results. Gummers cannot be depended upon to properly recondition more than 25 saws each. Liberal use of new gummers and side files makes for better sharpenings.

Each saw cylinder should be sharpened when the stand has turned out about 400 bales. The saw cylinder of the stand beneath the separator often receives more wear and damage and, therefore, more frequent sharpening and replacement may be needed. It is a good policy to have a spare saw cylinder on hand at all times. The rib spacing for satisfactory and full capacity ginning should be gauged at ⅛-inch at the ginning point, with the saws centrally located in the openings between ribs. [2]

BRUSH AND AIR-BLAST NOZZLE

Care and attention of brushes or air-blast nozzles are of great importance. Brush [3] bristles should have a tip speed of 6,666 feet per minute or 1420 r.p.m. for 18-inch diameter brush, 1600 r.p.m. for 16-inch diameter, and 1820 r.p.m. for 14-inch diameter. Bristles should mesh into, or overlap, the teeth not more than ⅛-inch or the full depth of the tooth. This adjustment should be checked following each sharpening of the saw or more often if needed. Nozzles [4] on air-blast gins should be adjusted to the saws with a clearance of ⅛-inch to 1/16-inch and should operate at a mouth pressure of 12 to 14 inches as measured on a water gauge. Dial gauges on the air-blast pipe will read approximately 2 inches higher than the actual nozzle pressure if the base connection of the gauge has a tube pointing into the air stream.

SEED BOARDS AND LAMBREQUINS

The seed board or seed fingers are adjusted at the end of the roll box by a lever called a "lambrequin", (sometimes called a lambreking). When the seed finger points are up (and lambrequin is down) the seed roll is tightened. When the fingers are down (and the lambrequin is up) a loose roll can be maintained with proper feeding rates. Many ginning troubles have arisen from seed fingers that are too long or are covered too much. When the seed board is in its central position the finger tips should not extend between the saws but should be even with the saw tips. The edge of any covering on the fingers should be not less than 1-inch away from the saw tips. All seed board fingers should have smooth round ends.

GIN SAW AND RIB RELATIONS

Each make of gin stand has its own special settings for the projection of the saws through the huller ribs. Unless these settings are maintained, the ginning may be faulty and the capacity low. Modern gins provide means on the bottom rib rails and fronts for adjusting the spacings between frames and rib assemblies to regulate projection of the saws through the ribs (12).

OTHER ITEMS

In brush gins, the dividing board (10) and the windboard (13) should be of metal or metal-covered wood.

In air-blast gins, the air-blast chamber (14) should be kept free of lint, mud and other accumulations or obstructions caused by damaged or bent piping. The nozzle should be checked for obstructions, bent or broken openings. The end cap of the last stand's air-blast chamber must be airtight. This is a good place to attach the air-blast pressure gauge.

Safety locks or clamps for hinges (15) should be kept in place at all times to protect gin stand operators against serious injury.

Faulty and slipshod erection practices are too frequent. Gin stands should be mounted and aligned on level metal rails; vee-belt drives should be provided with take-ups; and power drive belts should be heavily shielded with safety guards that broken belts cannot wrap around nor pull loose.

Practice good housekeeping at all times — this will contribute much toward accident and fire prevention as well as insure better quality cotton and cottonseed.

1 See USDA Leaflet No. 151.

2. See USDA Circular No. 393.
3 See USDA Circular No. 467.
4 See USDA Circular No. 510.

Acknowledgment

Cotton gin owners, operators and others connected with the ginning industry have long felt the need for instructions on the proper maintenance, adjustment and operation of cotton gins. This publication has been prepared to give such instruction on the gin stands.

There are some variations in the different makes and models of gin stands but they are similar enough so that the same general principles of operation will apply. Every effort has been made to give the ginner the very best information available at this time. However, it is recognized that with coming improvements in design of equipment some revisions in the recommendations must, in time, be made.

The information presented is the consensus of the following specialists who worked as a committee to give this publication both accuracy and usefulness:

Lawrence Ennis—Alabama Polytechnic Institute, Auburn, Ala.
Norris W. Gilbert—University of Arizona, Tucson, Ariz.
H. E. Beasley—Arkansas Extension Service, P.O. Box 391, Little Rock, Ark.
J. F. Forehand—Georgia Agricultural Extension Service, Athens, Ga.
M. M. Mayeux—Louisiana State University, Baton Rouge, La.
W. J. Murphy—University of Missouri, Columbia, Mo.
Marshall Thompson—New Mexico A. & M. College, State College, N. M.
J. C. Ferguson—North Carolina State College, Raleigh, N. C.
C. V. Phagan—Oklahoma A. & M. College, Stillwater, Okla.
S. A. Williams—Clemson College Extension Service, Clemson, S. C.
H. B. Jones—University of Tennessee Extension Service, Memphis, Tenn.
F. E. Lichte—Extension Service, Texas A. & M. College, College Station, Texas.

The Committee expresses its appreciation for the help of the following persons who assisted in the organization and preparation of this bulletin:

Chas. A. Bennett—Bureau of Plant Industry, Soils and Agricultural Engineering, U. S. Department of Agriculture.
Francis L. Gerdes—Cotton Branch, U. S. Department of Agriculture.
A. M. Pendleton—Extension Service, U. S. Department of Agriculture.
J. C. Oglesbee, Jr.—Extension Service, U. S. Department of Agriculture.