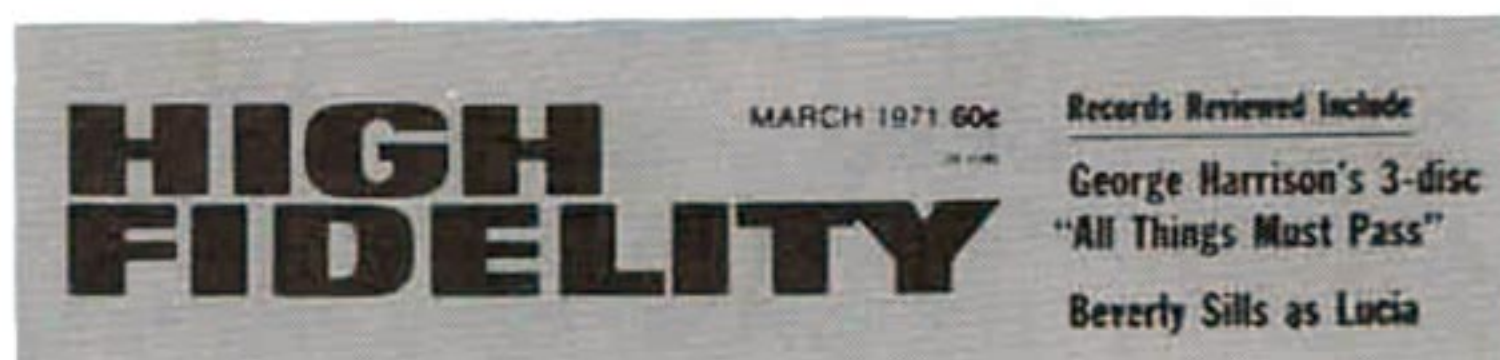




# Complete test reports on the Dual 1218 as published in the leading hi-fi magazines.

“Whether used as a changer or as a manual the 1218 behaved flawlessly for us. Considering this performance plus the superior measurements made in the lab... the Dual 1218 will attract many buyers.”



“As with all Dual turntables we have used, the 1218 operated silently, smoothly, and reliably.”



“In every respect a very smooth, flexible and easy-to-use record player... will accommodate the most advanced cartridges at their minimum usable tracking forces...”



“If you want to sacrifice virtually nothing (certainly nothing you will hear) get a 1218.”



“For those who long for a fine turntable, but who cannot get up the scratch for the 1219, the 1218 is the logical choice.”



“A piece of precision equipment that offers most of the performance, features and specifications of its high-priced relative, the 1219.”



United Audio Products, Inc., 120 So. Columbus Ave., Mt. Vernon, N.Y. 10553  
Exclusive U.S. Distribution Agency for Dual.



# HIGH FIDELITY

THE CONSUMER'S GUIDE **new equipment**  
TO HIGH FIDELITY EQUIPMENT **reports**

## Dual's Mighty Middle Model

**The Equipment:** Dual Model 1218, a three-speed automatic record changer (usable also as a semiautomatic or manual turntable assembly). Dimensions: 13 by 11 inches (main chassis; requires  $2\frac{3}{4}$  inches clearance below and approximately 5 inches clearance above chassis); wood base,  $15\frac{3}{4}$  by  $13\frac{3}{4}$  by  $3\frac{1}{2}$  inches. Price: \$155 including manual spindle, 45 adapter, and strobe disc; WB-12 base, \$10.95; DC-4 dust cover, \$12.95; DCB-5 base with dust cover, \$39.95. Manufacturer: Dual of West Germany; U.S. distributor: United Audio Products, Inc., 120 S. Columbus Ave., Mt. Vernon, N.Y. 10553.

**Comment:** The 1218 is priced about midway between the premium Model 1219 (HF test report, Jan. 1970), and the "budget" Model 1215 (Jan. 1972), and it shares the features of both, although its performance puts it closer to the 1219.

The main chassis is the same size as that in the 1215 and the main operating controls grouped along the front are identical in all but some styling details. The arm and its controls, however, are basically those of the 1219. The only major difference is in the vertical-angle adjustment system. For playing records automatically, the 1219 raises the entire arm assembly to the median height of the record stack. The 1218 leaves the arm in the manual position, but adjusts the angle of the cartridge mount. One item is unique in the 1218: The platter itself, at 4 pounds, 5 ounces, is heavier than that of the 1215 and is more stylish in appearance.

Beginning at the front left, the controls include the vernier speed adjustment (whose range CBS Labs checked out as  $+4$ ,  $-3\%$  at 33 or 45 rpm,  $\pm 2\%$  at 78), the three-position speed selector, the start/stop lever, and the three-position (7-, 10-, and 12-inch) record-size selector. To the right of the arm rest is the cueing lever. At the arm mount is the twin-gauge (one for spherical styli, one for ellipticals) antiskating control which, according to CBS lab measurements, applied antiskating forces that measured very close to theoretically exact values. At the arm pivot is an accurate stylus-force gauge, which showed no measurable departure from the indicated values to beyond 4 grams, and was only 0.1 gram high when set to 5 grams. A small knob in the cartridge housing selects either the M (manual) or S (stack) vertical-angle alignments. In the S position the lab found it produced a shift of some 2 degrees in the cartridge mount, aligning the cartridge for optimum position in playing the fourth record in a stack. The 1218 is designed to hold up to six records. Near the arm rest is a small hole in the chassis through which the arm set-down-position screw may be reached for adjustment; near the antiskating dial in a cueing-height adjustment



screw; on the back of the arm pivot assembly is a small setscrew to adjust the height of the arm during the changing cycle. In our sample all of these adjustments were found to have been accurately preset on arrival.

Setup is relatively simple. The most complex part is the installation of the cartridge on the mounting platform that holds it in place within the shell. Once the correct screws and spacers have been selected (Dual supplies quite a variety) the cartridge is aligned for height and overhang position by using a plastic gauge (also supplied) and the screws tightened. Then the platform is locked into the shell; the finger-hold on the shell doubles as a latch to hold the platform in place. The counterweight slips into place at the back of the arm and is held there by a setscrew near the arm pivot. Turning the counterweight sets it for precise balance; then tracking force and antiskating are simply dialed on the respective gauges and you're ready to go.

The automatic-change spindle is similar to that on other Duals: It supports the stack while gently lowering the bottom record by what Dual calls "elevator action." With the manual spindle (or the large-hole adapter for 45s) in place, the automatic controls still work. Pressing the start lever moves the arm over the record and play begins automatically. It also ends automatically—with the arm returning to its rest—in any mode of play. When the arm is picked up and moved toward the record for manual cueing the motor starts automatically. The cueing lever may be used to lower the arm or to interrupt play and resume later at the same point. The cueing system is damped in ascent as well as descent, preventing the arm from bouncing at the top of the up stroke unless the lever is handled with extreme roughness. As a result, the system's ability to return to the same groove is excellent in normal handling.

The 1218's excellence comes through in many more important ways, however. In testing speed accuracy, with the vernier set for exact performance at 33 rpm with line current at 120 volts, no error could be measured at any voltage for either 33 or 78 rpm. At 45 rpm, with all three test voltages (105, 120, and 127 volts), the speed was absolutely consistent at 0.1% fast—a negligible error (and one that can be corrected by a slight



touchup on the vernier of course). Rumble, measured by the CBS-ARLL standard, is 58 dB—an excellent figure one would expect of a premium-model turntable. Average flutter was measured at 0.05% unweighted, 0.07% with the new ANSI weighting—also excellent. Arm friction in both lateral and vertical planes proved to be immeasurably low, while the stylus force necessary for changer tripping was a mere 0.1 gram.

The tone arm weights are decoupled from the main body of the arm by a compliant rubber member; this feature, combined with the double bearings of the gimbal arm pivot, made the lab's measurement of arm resonance more complex than usual, but it also apparently

helps reduce resonant effects. Suffice it to say that after measuring the arm (with a Shure V-15 Type II cartridge) in four different planes (vertically, laterally, and perpendicularly to each groove wall) the most extreme peak the lab could find was a 9-dB rise at 6 Hz in the lateral plane.

Whether used as a changer or as a manual the 1218 behaved flawlessly for us. Considering this performance plus the superior measurements made in the lab, there seems no doubt that the Dual 1218 will attract many buyers. Though it costs \$30 less, the 1218 proves to be in the same league as the 1219.

# Popular Electronics

INCLUDING **Electronics World**

**T**HE Model 1218 is a new member of Dual's line of high-quality automatic turntables. It replaces the former Model 1209. In features and performance, the 1218 closely resembles the top-of-the-line Model 1219—at a considerably lower cost of \$155.00. (An optional walnut base is available for \$10.95.)

The Model 1218 is a three-speed turntable with a vernier adjust control which provides a total range of about 6 percent at each of the nominal speeds. The synchronous motor drives a 10 $\frac{1}{2}$ "-diameter, 4-pound non-ferrous cast platter. (This is one of the points of difference between the 1218 and 1219; the latter has a larger and heavier platter.)

The tonearm, supported on gimbal bearings (like the 1219), is balanced by a rotating threaded counterweight which is isolated from the arm by an elastic damping section. A coiled spring within the pivot assembly applies the downward tracking force; a dial, calibrated at 0.25-gram intervals from 0.25 to 5.5 grams, is used for setting the force. A separate knob on the motorboard is provided for setting the anti-skating correction. It has separate scales for conical and elliptical styli calibrated to match the tracking-force dial.

To maintain an approximately correct 15-degree vertical tracking angle whether playing a single disc or a stack of up to six discs, the turntable has a tilting cartridge mount. A small knob on the side of the slide-on plastic cartridge holder is marked S for single and M for multiple play. It can be used to set cartridge tilt so that the cartridge is parallel to the disc's surface when the turntable is operated in the single-play mode. In automatic operation, the cartridge is parallel to the surface of the center discs, and the stylus deviates negligibly from the correct vertical angle throughout the stack of discs with the knob set to M.

The basic operating control of the turntable is a single lever. In manual operation, it is moved to the left to start the motor and

## DUAL 1218 AUTOMATIC TURNTABLE (A Hirsch-Houck Lab Report)



index the tonearm. Moving the lever to the right returns the arm to its rest and shuts off the motor. A separate record-size selector indexes the arm for 7-in., 10-in., and 12-in. disks. For purely manual operation, one merely lifts the arm from its rest, which starts the motor, and places it on the disc. A silicone damped cueing control gently raises and lowers the arm at any point on the record's surface.

The metal turntable is covered by a ribbed anti-static mat which contacts the record only at its outer diameter. Two interchangeable spindles are provided: a short one which rotates with the turntable to eliminate any center hole wear when using the 1218 for single play, and an automatic one which accommodates up to six discs of the same size and speed.

**Laboratory Measurements.** At low-force settings, the calibration of the tracking force dial was very accurate. At a 3-gram setting, the maximum error was 0.1 gram; at the 4-gram setting, actual force was 4.5 grams; and at a 5-gram setting, it was 5.7 grams. At the 1-gram setting, the tracking force increased by 0.15 gram at the top of a  $\frac{1}{2}$ " disc stack.

When a cartridge was carefully installed using the plastic jig supplied with the 1218, the tonearm's tracking error was very small, measuring less than 0.4 degree per inch of radius over the entire disc and typically about 0.2 degree per inch or less. We found it necessary to set the anti-skating force slightly higher than indicated, especially at low tracking forces. However, this is not a critical setting, and one could safely use it with the anti-skating dial matching the

setting of the tracking force dial.

The turntable speed could be varied over a range of +4.5 percent to -3 percent at 33 $\frac{1}{3}$  rpm. The correct speed on our test unit was obtained with the vernier control set slightly below the indicated nominal speed point. A stroboscopic disc is supplied for making this adjustment. The speed was unaffected by line voltage changes or different record loads. Wow and flutter were very low, the latter being 0.04 percent at all speeds and the former 0.04 percent at 33 $\frac{1}{3}$  rpm and 0.025 percent at the two faster speeds.

The unweighted NAB rumble was 32 dB down and dropped to -36 dB when vertical components were cancelled by paralleling the cartridge outputs. With the CBS RRLI weighting, which correlates better with rumble audibility, the measurement was -54 dB, a typical figure for a good turntable.

We found no detectable arm/cartridge resonance in the 10-500-Hz range, using an Empire 1000ZE/X cartridge. The change cycle took 12 seconds at 33 $\frac{1}{3}$  rpm and 7 seconds at 78 rpm.

**Comments.** As with all Dual turntables we have used, the 1218 operated silently, smoothly, and reliably. It is apparent that in all important respects it is very similar to the 1219.

The low-friction arm bearings are equal to the task of carrying any cartridge made at the lowest tracking force of which it is capable (we had no difficulty operating at 0.5 gram). The damped cueing system operated very smoothly, and when the anti-skating force was set to match the tracking force, it returned the stylus to the same point at which it left the record. If tracking forces of less than 1 gram are used, and if the anti-skating force is set to an optimum value, there is some outward drift of the pickup during descent. But since few cartridges can (or should) be operated at less than 1 gram of tracking force, this is unlikely to present any difficulties.



# MODERN HI-FI & STEREO GUIDE

## TESTED IN THE HOME

by Robert Swathmore

### DUAL 1218 AUTOMATIC TURNTABLE



Dual was the company which made the automatic turntable a high fidelity instrument 'way back in the early 1960s—and since then it's been known for technical innovations and design features usually found on manual record-playing equipment rather than automatics. The latest model, the 1218, is a slightly less expensive version (\$155.00) of the top-of-the-line Dual 1219.

It contains a number of features found in the 1219—but in producing an economy model,

have the producers sacrificed quality? We don't think so. There are such features as selection of manual or automatic play for the stylus (a click of the selector switch alters the stylus angle to compensate for more than one record on the stack), as well as Dual's easy-to-adjust damped counterbalance and a gyroscopic gimbal suspension for the tone arm, which minimizes friction. As with other Dual models, once you've balanced the arm and cartridge, all you have to do to obtain the correct stylus pressure is to set a dial. An anti-skating feature is included, with separate scales for conical and elliptical styli. And there's an adjustment for speed variation, to raise or lower the pitch of the music you're listening to, variable within six per cent.

Many of these features aren't new with the 1218. But their operation, as in the 1219, is flawless and quiet. We found the cue control accurate within three grooves, for example, and more gentle than those on some other changers. The change mechanism is both gentle to records and quiet. We tried several of RCA's super-thin Dynaflex records to give the umbrella feeders a workout—no jams, no double drops, no records stuck on the spindle. We found tone arm adjustments quick and easy to make—and accurate within .2 gram at 3 grams; absolutely perfect at ½ gram.

The motor is a synchronous high-torque type which brought the four-pound platter up to speed in less than one revolution. It's both quiet and powerful; we found wow & flutter well below audible levels. The heavy turntable platter acts as a flywheel to even out any speed variations. It's die-cast, with a centrifugal design somewhat different from conventional turntable platters, to counteract any vibration or irregularity in the drive mechanism.

You'll notice that the 1218 has one speed less than older Dual models. The 16 2/3 rpm speed has been eliminated in favor of cleaner, simpler operation. But the unit still has a 78 rpm speed for collectors of older records. Since you can count on the fingers of both hands the number of 16 2/3 rpm discs ever released commercially, the loss of this speed isn't likely to inconvenience you.

Then why not eliminate 78 rpm as well? Although 78 rpm records haven't been released by the major manufacturers for more than a decade, Dual feels there still are enough of them around in its customers' collections to warrant retaining it.

Overall, this is a piece of precision equipment that offers most of the performance features and specifications of its higher-priced relative, the 1219.





## Dual Model 1218 Automatic Turntable

### MANUFACTURER'S SPECIFICATIONS

**Speeds:** 33 $\frac{1}{3}$ , 45, and 78 rpm; adjustable  $\pm 3\%$ . **Platter Diameter:** 10 $\frac{5}{8}$  in. **Maximum Tracking Error:** 0.5 deg. **Wow and Flutter at 33 $\frac{1}{3}$  rpm:** 0.80%. **Pivot-to-stylus Distance:** 8 $\frac{1}{4}$  in. **Dimensions:** 13 x 10 $\frac{3}{4}$  in., 2 $\frac{5}{8}$  in. below motor board, 5 in. above. **Weight:** 10 lbs. **Price:** \$155.00.

There are many locations for automatic record changers that will not accommodate the larger units, such as the Dual 1219, but the user still wants the same performance obtainable with the top-of-the-line model, or as near that performance as possible. And therein lies the advantage of the 1218, which is very similar in performance, yet just a little smaller, and therefore can often be utilized in locations which preclude the use of the larger model.

The 1219 was profiled in these pages in December, 1969, and most of what was said in that profile could apply to the 1218. The newer—and smaller—unit still uses the two-ring gimbel mounting for the tonearm, with the elastically damped counterbalance which rotates on fine threads for fine balance, once the coarse balance is set by positioning the counterbalance shaft for approximate balance and tightening the thumb screw which keeps it in place. Stylus force is then set by a calibrated dial which applies the desired force through a long spiral spring which acts directly around the pivot of the tonearm.

Adjacent to the arm mounting is a knob which controls the amount of anti-skating force applied to the arm. The scale associated with this knob is calibrated for both conical and elliptical styli, with the graduations in black for elliptical styli, and in red for conical ones—indicative of the almost unanimous acceptance of the elliptical in high-quality installations. A hole in the chassis just in front of the arm mounting gives access to an adjustment for varying the tonearm cueing height over a range of  $\frac{1}{4}$  inch. The bearings for the two degrees of motion of the turntable are of the low-friction pivot type, and the manufacturer claims bearing frictions of less than one-hundredth of a gram in the vertical direction, and less than two-hundredths in the horizontal.

The cartridge mounts on a holder which is locked to the tonearm head by a single lever. One advantage of this cartridge holder is that the screw head fits into slots in the holder and the cartridge is held by nuts on the cartridge end of the screws, so it is not necessary to choose the exact length of mounting screw to avoid excessive length which would inhibit the proper seating of the holder in the head. In some cartridge mounts, the screw threads directly into the plastic mount, and again the exact length must be selected to avoid interference with the placement of the holder into the head. Furthermore, threads into the plastic often wear with several changes—as some of us are wont to make in the search for the best cartridge for our systems. In the 1218, the vertical tracking adjustment is built into the head, with a small knob extending to the right to permit setting for single- or multiple-record use. This knob turns 90 deg. to either the "S" position for single-play use, and to the "M" position when several records are stacked on the spindle. This control adjusts for 15-deg. tracking for either one record, or for the middle records of a stack of six.

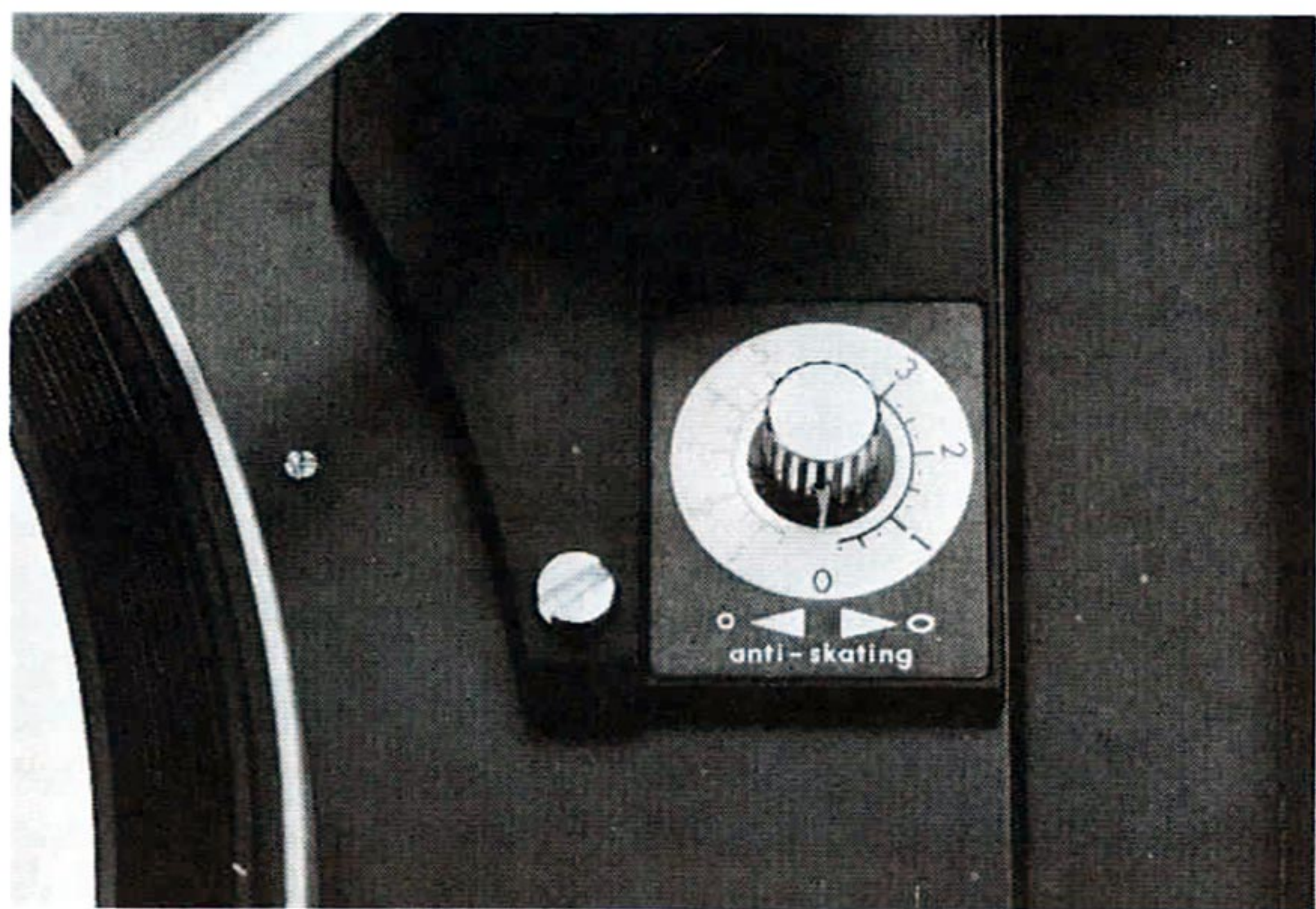
The arm rest is fitted with a lock which secures the arm to the post and should normally be released before starting to play. However, if you should fail to release the lock, you have only to wait until the unit goes through its cycle and the operating lever returns to the center position. No harm will occur. You simply release the lock and start again.

The right front corner of the chassis is where the action is—the lever to the right controls the point at which the arm sets down—for 7-, 10-, or 12-inch records. The other lever has a rest position at the center, and start and stop positions. To initiate playing, you press the lever to the left, and the mechanism takes over: starting the motor, raising the arm from the rest and positioning it over the lead-in groove of which record

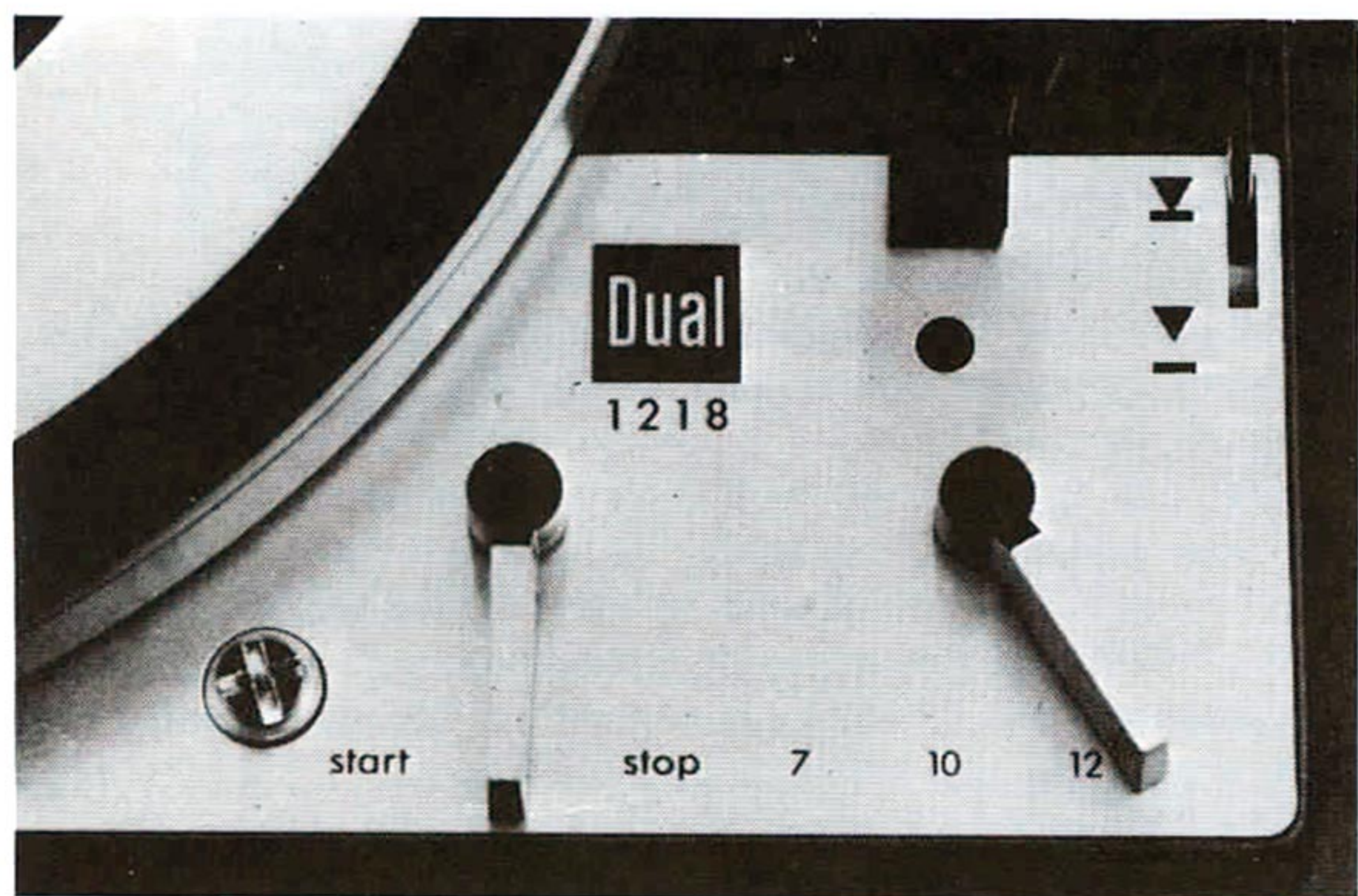


**Fig. 1**—Most adjustments are found near the arm mounting—coarse and fine counterbalance, stylus force, anti-skating, and tonearm cueing height. Note record spindle for single-play use—it rotates with the platter to avoid wearing the center hole and to ensure concentricity.

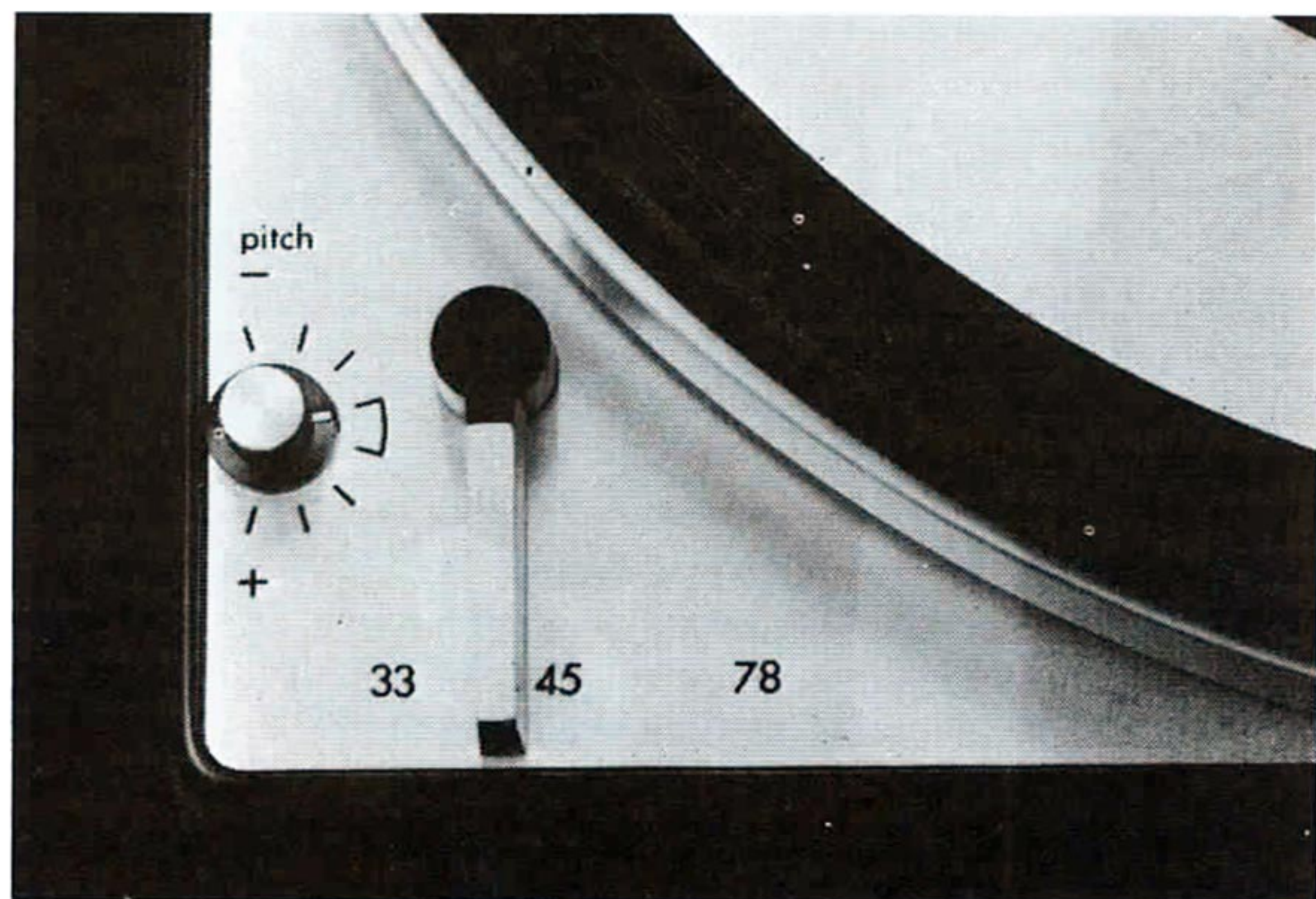




**Fig. 2**—Anti-skating adjustment knob, with its two scales—the one for conical styli adjusts for as much as five grams, while the one for elliptical styli adjusts only to three grams, which is, of course, about as high a force as should ever be used for these popular styli. The slotted screw head to the left of the knob adjusts the tonearm cueing height.



**Fig. 3**—The right front of the chassis accommodates the three most-used operating controls—the cueing lever, which extends out of the photo at the upper right, the record-size selector with positions for 7-, 10-, and 12-in. records, and the start-stop lever. The hole above the record-size lever gives access to an adjustment for the set-down position for 12-in. records.

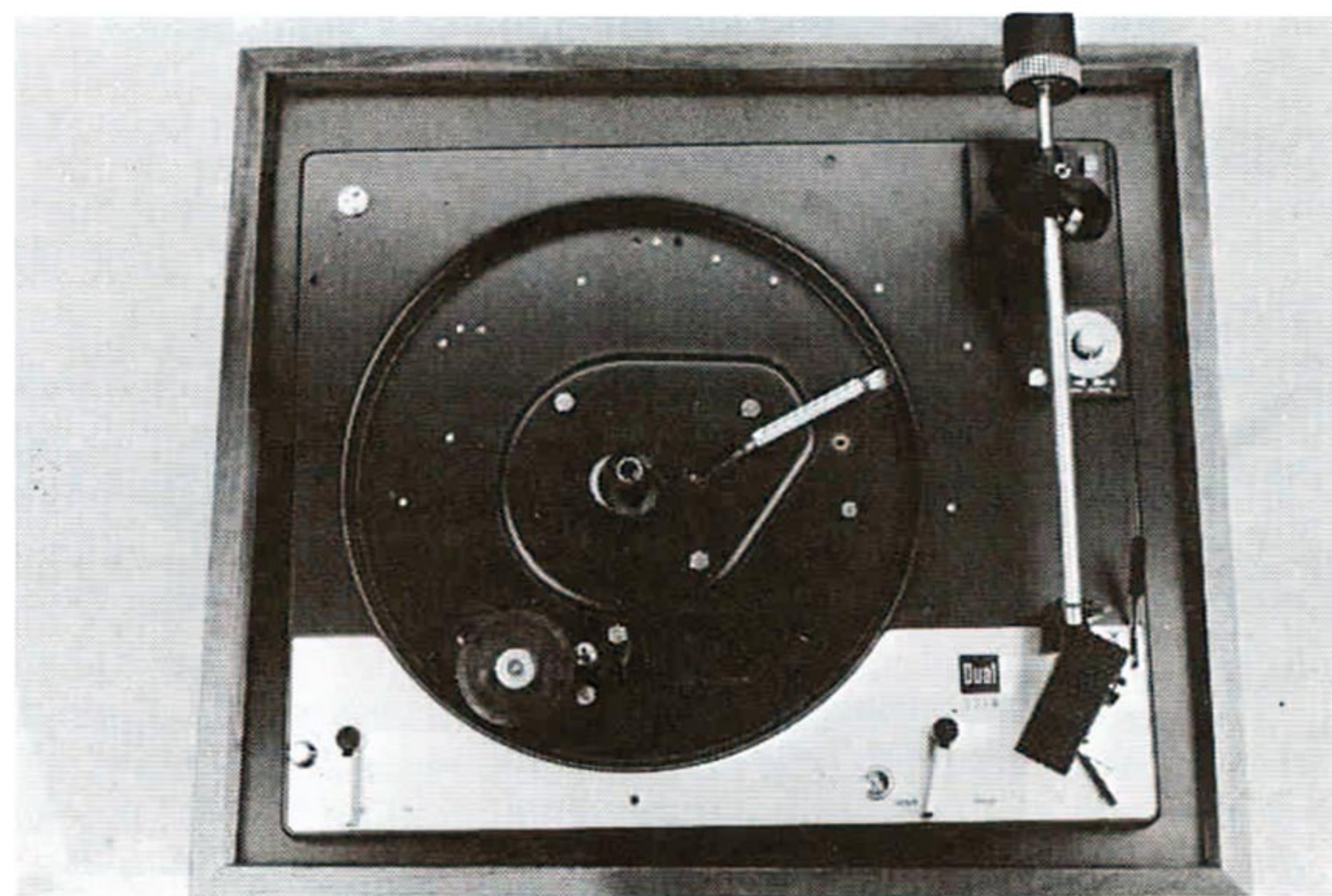


**Fig. 4**—The left-front corner accommodates the speed controls—the lever for the three nominal speeds, and the knob for vernier adjustment of turntable speed over a range of  $\pm 3\%$ .

size you have selected, lowering the arm gently to the record, and returning the lever to the center position. If you prefer, you simply lift the arm from the rest and position it over the record anywhere you like—the motor starts and you can either place the stylus on the record by hand or you may use the cue-control lever to lower the arm automatically. You can interrupt the play at any time by moving the cue lever forward—the arm will lift up, but the motor continues running, and you can continue playing from the same place by moving the cue lever back.

If you are playing a stack of records, you operate the start lever and let the mechanism take over—the entire stack will be played through the unit will stop, returning the arm to the rest and shutting off the motor. To reject a record and change to the next one on the spindle, you move the lever to the start position. You can even play one record continuously by using the automatic spindle and placing the 45-rpm adapter disc on the spindle platform.

over at the other corner of the chassis are the speed controls—a lever to select the nominal speed of either  $33\frac{1}{3}$ , 45, or 78 rpm—and a knob which varies the speed up or down by three per cent as desired to match the pitch to an instrument, for example.



**Fig. 5**—Top view of the unit with the platter removed, showing the simplicity of this side of the chassis. The idler wheel, shown at the lower left of the turntable well, retracts from the stepped and tapered motor shaft when the stop position.

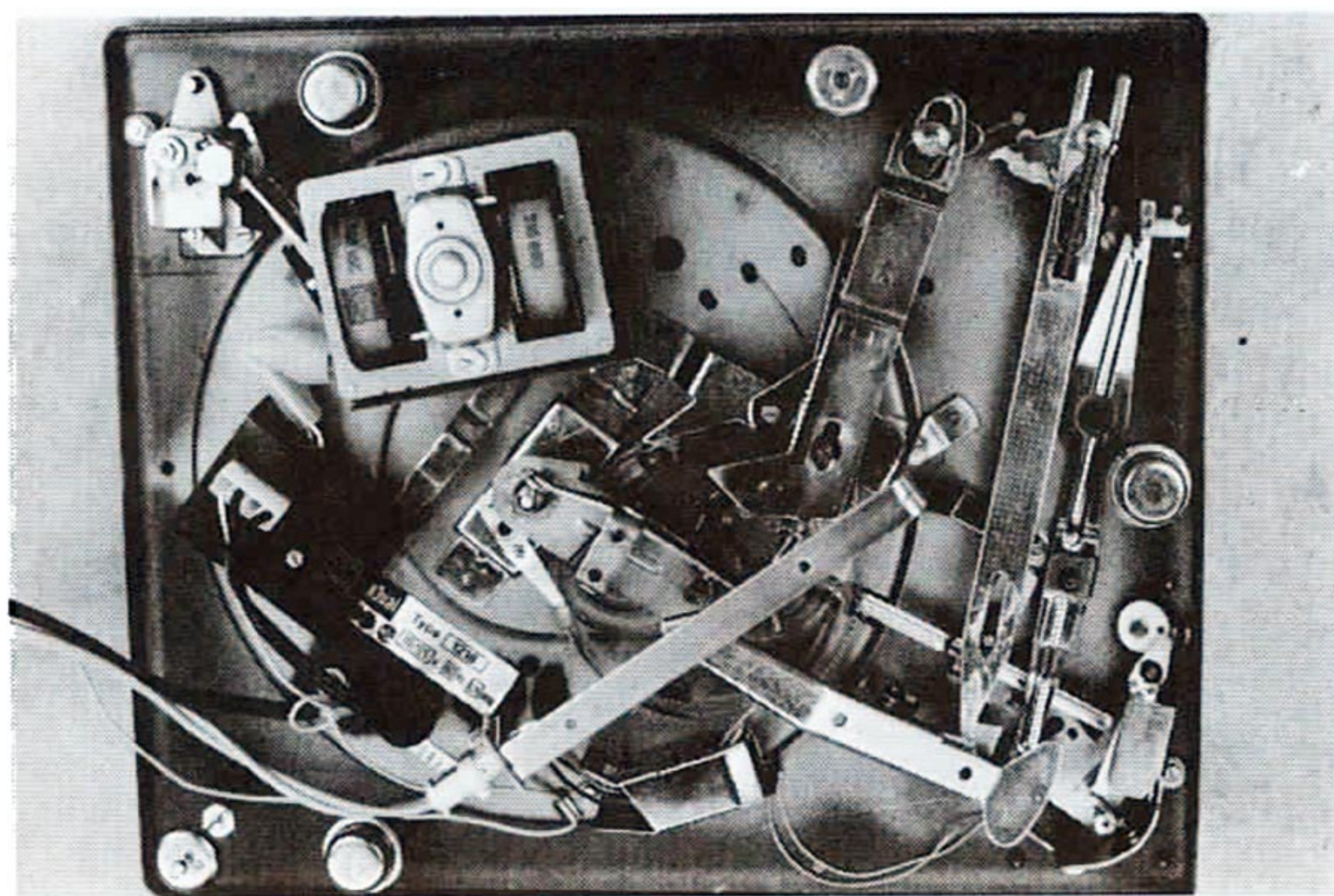
## Performance

The 1218 is an especially easy turntable to use. The controls are foolproof, and no harm results from changing a control setting during a change cycle, for instance, or for forgetting to release the arm lock before starting the playing. It has all the features needed for controlling its action, and appears to be well constructed. It is, of course, the most recent of a long line of changers and record players which have been improved continuously since the introduction of the first Dual in 1927, when the name came from a combination of both spring drive and an electric motor in the same turntable.

The platter is die cast of non-ferrous material and weighs four pounds—always a desirable feature to ensure constancy of speed. The black and chrome appearance of the unit is attractive, simple, and functional.

We measured its performance characteristics and found a signal-to-noise figure of 44 dB, using the old NAB method. With a standard "A" weighting network, this figure increases to 62 dB—in itself considerably better than the average "hi-fi" single-play turntable of a decade ago. Wow—the speed vari-





**Fig. 6**—The underside of the chassis is where the complexity is—and it is remarkably similar to the top-of-the-line 1219.

ation below 6 Hz—was measured at 0.1 percent—while flutter was 0.05 percent measured from 5 to 250 Hz. Cycling time was measured at 13 seconds when operating at 33 $\frac{1}{3}$  rpm, 11 second at 45, and 8 seconds at 78. Well do we remember when a changer that cycled in 25 seconds was considered acceptable—as, of course, it was if you compared it to the early models of the Capehart, for instance.

The synchronous motor showed no speed variation whatever over a voltage range from 85 to 135 volts, but being synchronous, it was susceptible to frequency variations in the supply. This is of little concern to anyone in this country since electric companies must maintain a close tolerance over frequency to make interconnections between areas possible. If the unit were to be used in other countries, it would require a change of the motor pulley, since the United States and Canada are just about the only places where 60 Hz is the prevailing frequency of power lines. However, this problem would arise with any synchronously driven equipment, and it can be cured, fortunately.

For those who long for a fine turntable but who cannot get up the scratch for the 1219, the 1218 is a logical choice, and it will certainly give long and satisfactory service for the average user.

*C. G. McProu*

# Stereo Review

## EQUIPMENT TEST REPORTS

By Hirsch-Houck Laboratories

### Dual 1218 Automatic Turntable



● THE NEW Dual 1218 deluxe automatic turntable is the model priced immediately below the deluxe top-of-the-line 1219. The 1218 shares many features with the Model 1219, such as a tone arm that pivots within two concentric gimbal rings, a high-torque synchronous motor with speed unaffected by line voltage or load changes, and a cueing control with silicone-damped motion in both directions.

The Dual 1218 is somewhat smaller than the Model 1219, with chassis dimensions of 10 $\frac{3}{4}$  x 13 inches (as compared with 12 x 14 $\frac{3}{4}$  inches for the Model 1219). Its one-piece non-ferrous cast and machined platter is 10 $\frac{5}{8}$  inches in diameter and weighs 4 pounds (against the 12-inch, 7-pound 1219 platter). The tone arms of both units are of similar design: the 1218 arm is  $\frac{1}{2}$  inch shorter, but it is still very much a “full-sized” arm for an automatic turntable. Another obvious difference between the two players is the method of compensating for the change in vertical tracking angle when playing a single record, or a stack in automatic operation. In the 1219, the entire arm assembly is moved up and down to maintain the correct 15-degree angle on one record or at the center of a stack of six. The 1218 accomplishes the same thing, apparently with equal effectiveness, with a small knob on the side of the plastic slide-in cartridge

holder. Marked S and M for single or multiple play, it tilts the cartridge slightly on its mounting in the vertical plane. Since the effective center of rotation corresponds to the position of the stylus tip, there is no change in stylus overhang.

The Dual 1218 has the same anti-skating correction system as the 1219, with a control knob on the motor-board and separate calibrated scales for conical and elliptical styli, which require different anti-skating corrections. The scales, which correspond to the tracking force used, cover a range of 0.5 to 5.5 grams for conical styli and 0.25 to 3.5 grams for elliptical styli. The arm is balanced by an elastically damped, threaded counterweight, with click stops for easy adjustment. The tracking-force dial, which is part of the pivot assembly, turns a coiled spring to apply a downward force to the pickup. It is calibrated at 0.25-gram intervals from 0.25 to 5.5 grams.

The Dual 1218 is a three-speed machine (33 $\frac{1}{3}$ , 45, and 78 rpm), with a vernier control providing a total adjustment range of about 6 per cent at each nominal speed. A separate record-size selector indexes the arm for 7, 10, or 12-inch records. The basic operating control is a single lever, which is moved to the left to start the motor and index the arm for both single and multiple-play modes. When moved to the right, it shuts off the motor, and the arm returns to its rest. The 1218 can also be used in a fully manual mode, since lifting the arm off the rest and moving it toward the record starts the motor automatically. The machine is completely jam-proof, and the arm movement can be stopped at any point in the change cycle without either causing problems or risking damage.

Two record spindles are provided: a short single-play spindle that rotates with the turntable, and a multiple-play spindle that will hold up to six records of the same size and speed. The metal platter is covered with an anti-static mat, with raised ribs that contact the record only at its outer diameter. The viscous-damped cueing control functions in both single- and multiple-play modes. The price of the Dual 1218 is \$155.00. Walnut

(Continued on back page)



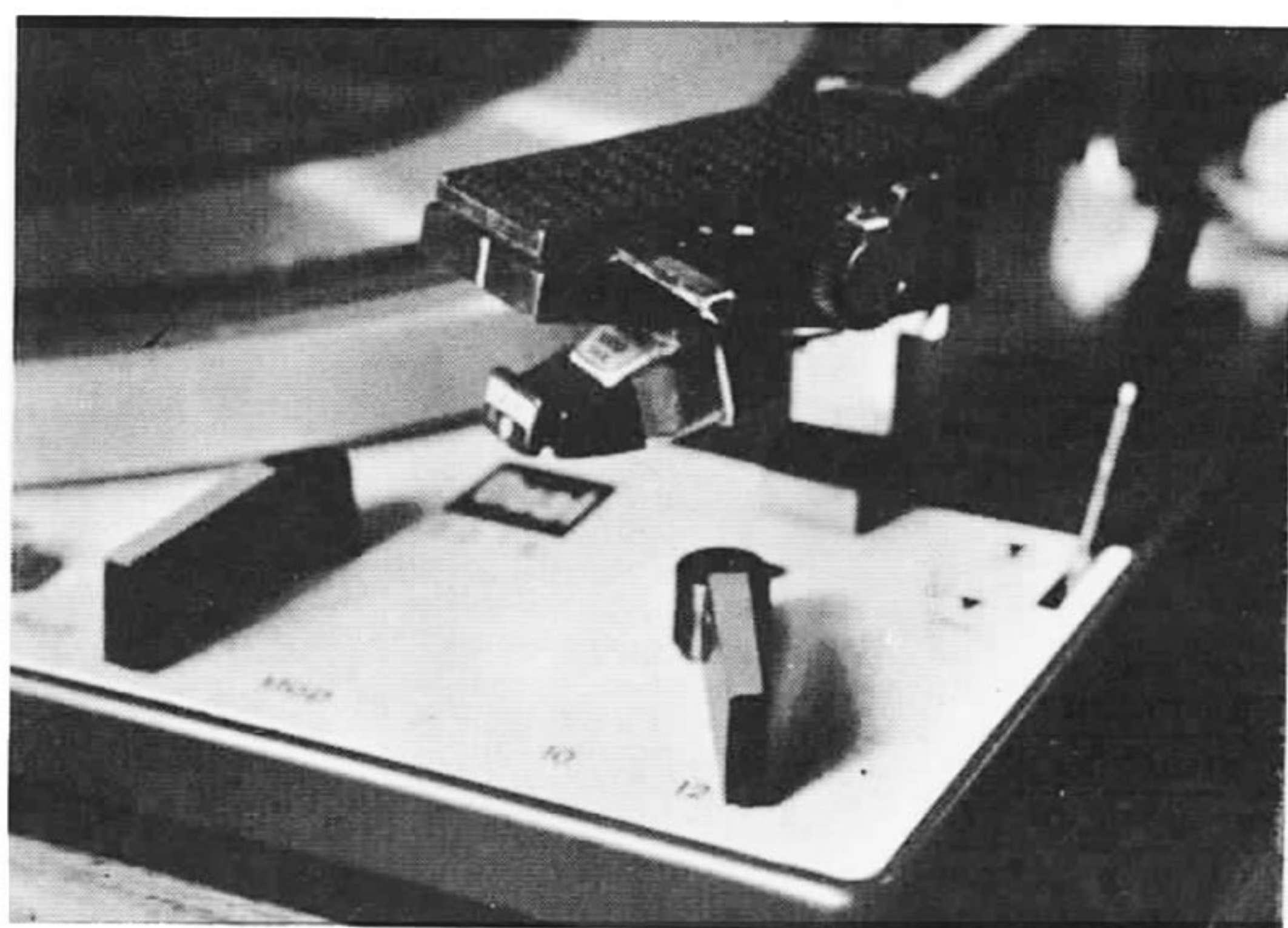
bases are available in several styles, starting at \$10.95. Plastic dust covers are additional.

● **Laboratory Measurements.** The tracking-force calibration of the Dual 1218 was very accurate at low forces, with the maximum error of 0.1 gram occurring at a 3-gram setting. At a 4-gram setting, the actual force was 4.5 grams, and at a 5-gram setting it was 5.7 grams. When set for 1 gram, the force increased by only 0.15 gram at the top of a half-inch record stack.

When a cartridge was installed with the aid of the plastic positioning jig supplied with the unit, the arm tracking error was very small—less than 0.4 degree per inch of radius over the entire record, and typically under 0.2 degree per inch, which is an excellent figure. We tested the Dual's anti-skating system with an Empire 1000ZE/X cartridge installed. At a 0.75-gram tracking force, the optimum anti-skating setting was 1 gram; at 1.5 grams the optimum setting was 2 grams. In practice, these differences are insignificant, and different results might have been obtained with a different cartridge.

When using a tracking force of 1 gram or more, with the anti-skating compensation set according to the dial calibrations, the damped cueing system always returned the pickup to the same groove, or, at most deviation, to the preceding groove. However, when operating at 0.75 gram or less, applying the additional anti-skating which we found to be optimum, there was appreciable outward arm drift during descent. This may or may not be a bother to some users.

The turntable speed could be varied over a range of +4.5, -3, per cent at 33 $\frac{1}{3}$  rpm. A stroboscope disc is supplied for making this adjustment. The speed was totally unaffected by line voltage or record-stack variations. Wow and flutter were very low, with the latter being 0.04 per cent at all speeds, and the former 0.04 per cent at 33 $\frac{1}{3}$  rpm and 0.025 per cent at the other speeds. The unweighted (NAB) rumble was -32.5 dB, including ver-



*A knob on the 1218's cartridge shell tilts the cartridge to adjust the vertical-tracking angle. Positions are provided for single-play operation and the center of a six-record stack.*

tical and lateral components, and -36 dB with the vertical rumble cancelled out. Using the CBS RRL measurement weighting, which correlates well with audible effects, the combined rumble was -54 dB, a good figure. There was no detectable arm/cartridge resonance in the 10- to 500-Hz range. The change cycle required 12 seconds at 33 $\frac{1}{3}$  rpm and 7 seconds at 78 rpm.

● **Comment.** It appears that every basic operating feature of the \$185 Dual 1219 has been included in the more moderately priced Model 1218, and with no significant sacrifices in performance. It is in every respect a very smooth, flexible, and easy-to-use record player, and will accommodate the most advanced cartridges at their minimum usable tracking forces. It is, in short, an excellent value.

## STEREO & HI-FI TIMES

### Dual 1218 Automatic Turntable

**W**hat is the difference between the 1218, this newest model, and the 1219, the best automatic turntable Dual makes? Answer: a slightly shorter arm, tracking angle adjust-

ment at the cartridge instead of the arm base, a slightly lighter and smaller diameter turntable platter. Everything else seems the same.

Surely, my measured specifications are about the same. In fact, rumble was one decibel better on this new model than the 1219 I tested at the end of 1969. Rumble measured -41 dB unweighted from a 3.54 cm/sec. 1 kHz signal on a test record. Weighting it with a 50 Hz cutoff reduced rumble to -44 dB. Flutter was 0.15 per cent peak. Arm resonance was under 2 dB and below 15 Hz.

Tracking error distortion was higher because of the shorter arm, but not so that you could hear it, but only measure it. The same motor and arm mechanism is used, so speed

is synchronously exact (there is a vernier adjustment); the arm's stylus force gauge is accurate to within 0.1 gram; and separate scales for elliptical or conical stylus anti-skating compensation is still used.

The change mechanism is exactly the same as before. That is to say, it is the easiest available system on records. And you can install a short spindle that rotates with the platter converting the 1218 into an automatic single play unit (with an automatic lift at the end of the record).

I have obviously written a short report. Short and sweet. If you want the best Dual, get a 1219. If you want to sacrifice virtually nothing (certainly nothing you will hear) get a 1218 and save about \$30. List price without base is \$155.00.