

ZENITH RADIO CORP.

COBRA-MATIC RECORD CHANGERS

MODELS S14028, S14029, S14030,

S14031 and S14036

The Zenith Models S-14028, S-14029, S-14030, S-14031 and S-14036 Record Changers are designed to play standard 78, 45 and 33 1/3 RPM records of standard commercial dimensions. With few minor exceptions these five changers are alike electrically.

Features of these changers include playing and automatically changing as many as ten 12" or ten 10" records. Ten inch and twelve inch records of the same type cannot be intermixed.

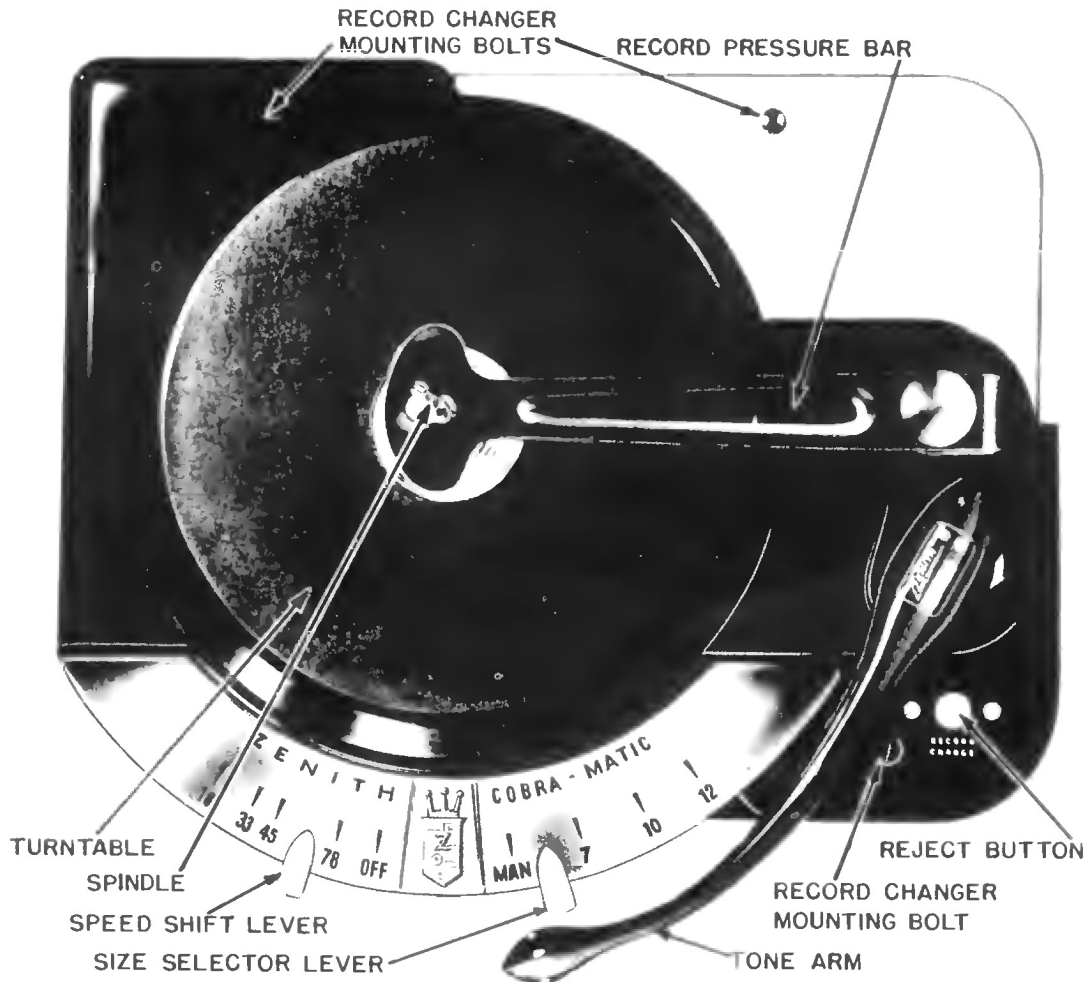
A full stack of 7" 33 1/3 RPM, or a full stack of 7" 45 RPM records (with adapter inserted in the records) can also be played on this changer. This changer does not shut off after the last record, however, all that is required to turn the changer off is to move the speed change lever (18) to OFF position.

LOADING THE RECORD CHANGER

1. Pull straight up on the record pressure arm knob (12) until the record pressure arm clears the spindle. Swing the record pressure arm to the right until pins in pressure arm shaft (14) drop into locating slot on record pressure arm housing (1).

2. Changer will automatically play ten 12" either standard or Long Play, ten 10" either standard or Long Play or ten 7" Long Play or Fine Groove records.

NOTE: Standard, Fine Groove and Long Play records cannot be played in the same stack of records. Speed change lever (18) must be re-set for each type of recording.



ZENITH Record Changer

3. Place records on spindle and lower them to offset shelf. Level records and replace record pressure arm (14) over spindle and lower this until it rests on the top of the record stack.

To play standard 78 RPM recordings:

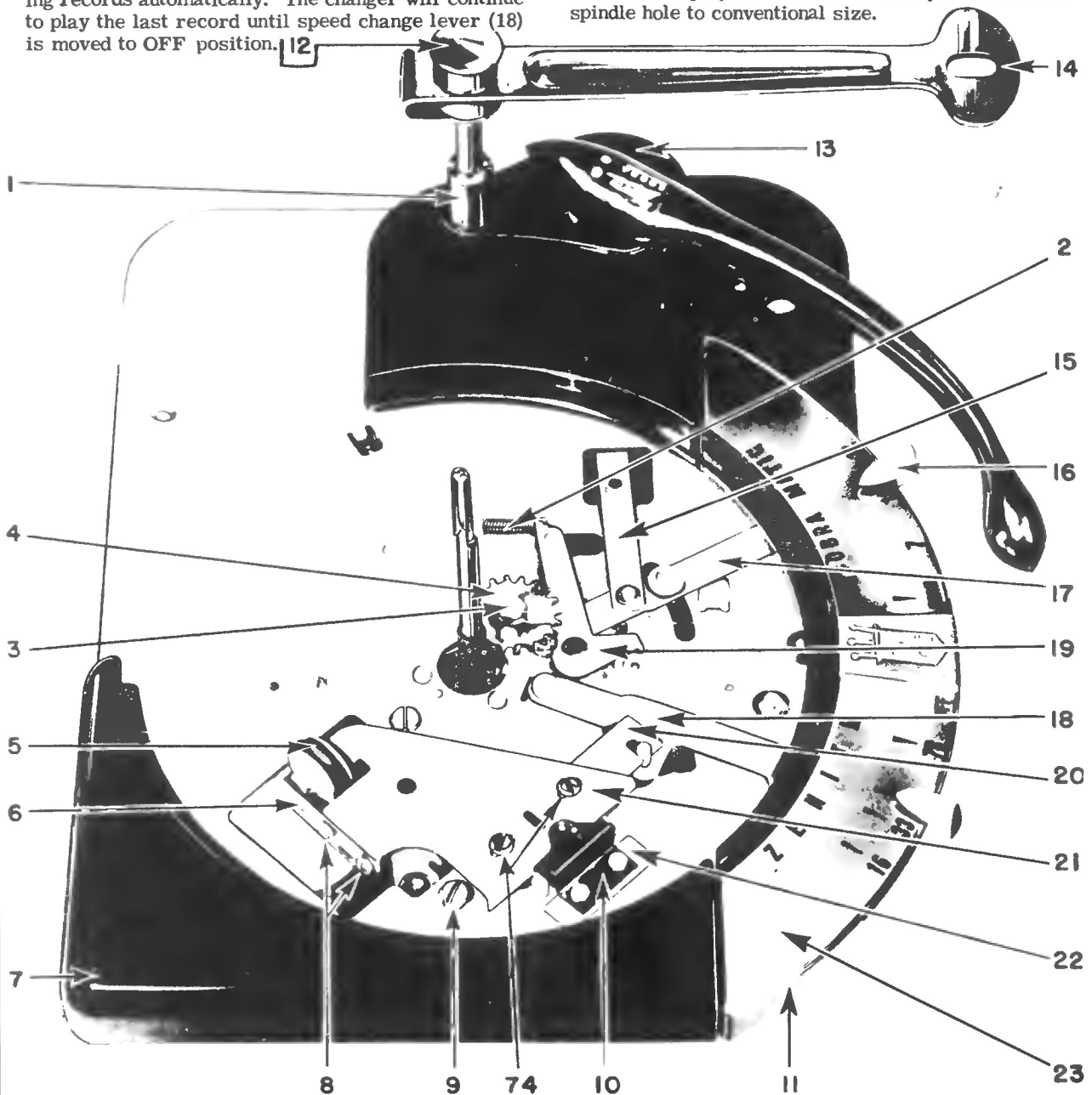
1. Motor speed control lever (18) must be set to 78 position. This will set the record changer to proper speed position and cause the turntable to rotate.
2. Set-up lever (17) must be moved to the size records being played.
3. Place the changer in cycle by depressing reject switch knob (73). The changer will play the remaining records automatically. The changer will continue to play the last record until speed change lever (18) is moved to OFF position.

To play 33 1/3 RPM records:

1. Motor speed change lever (18) must be in 33 1/3 position.
2. Set-up lever (17) should then be moved to either 12", 10" or 7" position depending on the size record being played.

To play Fine Groove (45 RPM) records:

1. Speed change lever (18) should be moved to 45 position and set-up lever (17) should be in 7" position. It must be remembered that these records are manufactured with a 1 1/2" spindle hole so it is essential that a record adapter be inserted into each 45 RPM record to be played. This is necessary to reduce the spindle hole to conventional size.



Record Changer Top View with Turntable Removed

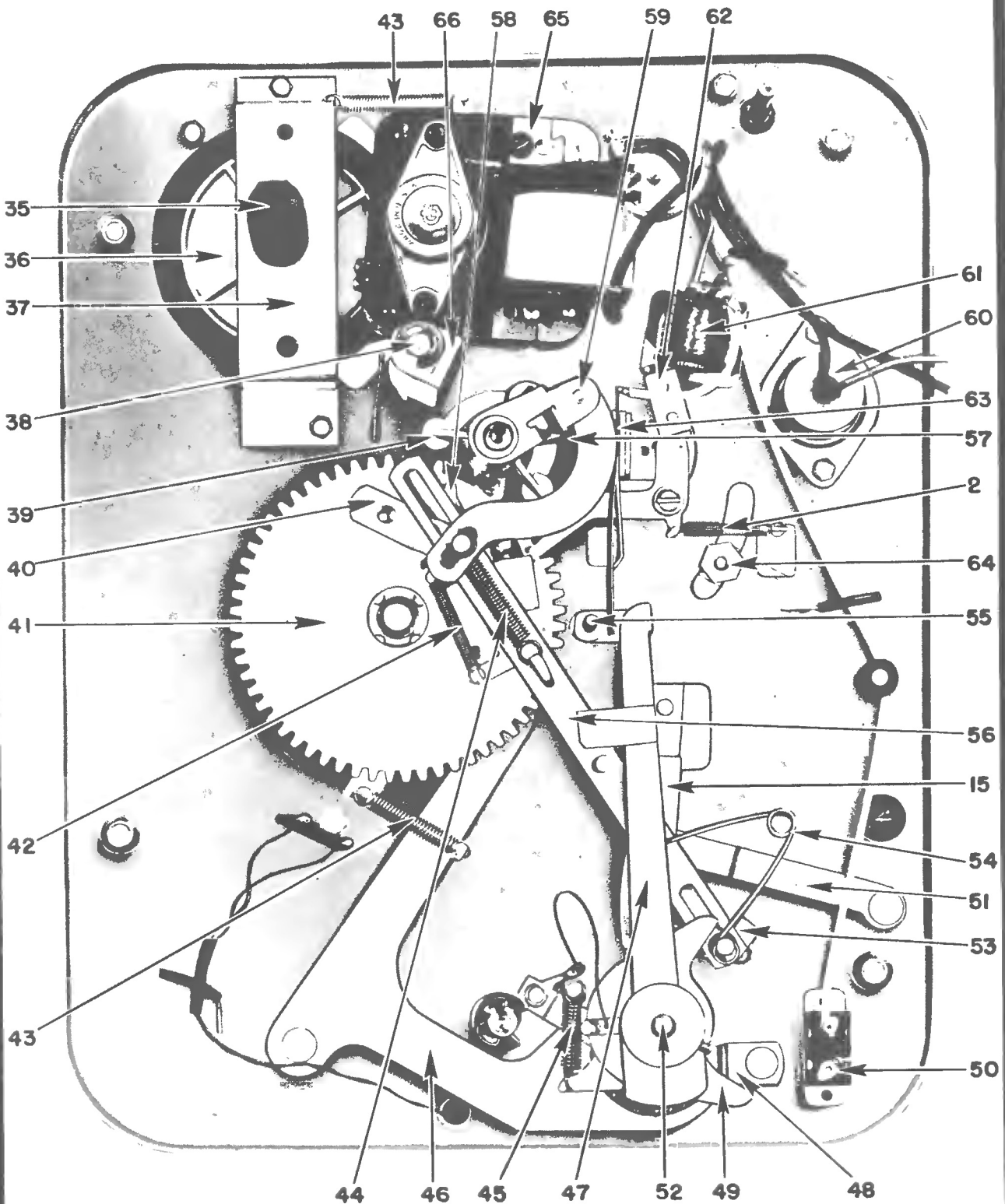
REJECTING

To reject a record anytime, while the changer is operating, depress reject switch button (73) and release. This will automatically cause the record changer to go through cycle and begin playing the next record.

ZENITH Record Changer

STOPPING

To turn off the record changer all that is required is to move the speed shift lever (18) to OFF position.



Record Changer Bottom View

ZENITH Record Changer

UNLOADING

Lift the record pressure arm (14) and swing it to the right until the pin on the shaft drops into the locating groove on record pressure arm shaft housing (1). Lift stack of records straight up on spindle.

MANUAL OPERATION

To play single records or home recordings, lift up the record pressure arm and turn it to the right. Place record on spindle and lower to the spindle shelf. Gently push record towards record pressure arm shaft and lower to turntable. Move speed change lever (18) to proper speed for type of record being played and move set-up lever (17) to manual position. Pick up tone arm and place the needle on the lead-in groove of the record.

DESCRIPTION OF CYCLING

The motor shaft contacts drive wheel assembly (36) and causes it to rotate by friction contact with its rubber surface. Drive wheel assembly (36) drives idler wheel (5). The underside of the turntable is in contact with idler wheel (5) and is driven in this manner. Speed of the turntable is controlled by changing the position of the idler wheel (5) on drive wheel (36). When idler wheel is moved to the center of drive wheel (36) it will rotate more slowly than when moved to the outer edge of this drive wheel (36). In this manner the turntable can be driven at any speed from 10 to 85 RPM. Minor adjustments for proper tonal pitch can be made by simply moving speed change lever (18) back and forth to compensate for turntable speed which may vary due to line voltage changes. When reject button (73) is depressed it energizes solenoid (61) which then attracts trip pawl assembly (62). The same thing occurs when the forward movement of the tone arm causes friction lever and weight assembly (47) to contact the copper bronze contact on trip switch assembly (63). When gear segment (58) is released, gear pawl spring (42) causes the gear segment (58) to engage the rotating pinion gear (25) under the turntable thus causing clutch assembly (41) to rotate.

As clutch assembly (41) rotates, tone arm lift lever (46) swings in such a manner that it contacts tone arm lift pin and raises the tone arm. Simultaneously, tone arm link and stud assembly (56) slides towards, and contacts one finger of tone arm lever assembly (49) forcing the tone arm towards the outer edge of the turntable and then on its return swing contacts the other finger of tone arm lever assembly (49) swinging the tone arm back over the records. The position to which it swings the tone arm over the records is determined by the position of record size discriminator (51). There are three steps on the record size discriminator (51) which determines set-down position

for 7", 10" and 12" records. The tone arm lift lever (46) returns and releases brake lever assembly (48) which keeps the tone arm from moving erratically during cycle. Simultaneously, ejector lever and link assembly (59) rotates and this in turn causes spindle shaft (30) to rotate and ejector cam (29) to push the record off the spindle shelf. Operation of the tone arm set-down adjustment can be observed by raising the tone arm so the adjustment mechanism can be viewed.

VELOCITY TRIP

This changer is provided with what is commonly known as a velocity trip rather than a ratchet and positive trip mechanism. A velocity trip depends for the tripping action on the rate of forward motion of the pickup arm with respect to the turntable rotation. The changer will trip only when the tone arm advances more in one revolution of the turntable than the distance between normal grooves in a record. Only records having fast finishing grooves will operate the velocity trip. During the normal playing cycle, friction lever and weight assembly (47) continually moves forward toward the copper bronze contact on trip switch assembly (63).

On normal forward advance, the friction lever and weight assembly (47) is kept from contacting the copper bronze contact by a wiping action from oscillating lever stud assembly (55). The oscillation of oscillating lever and stud assembly is produced by eccentric motion of oscillating gear (4) which is driven by the pinion gear (25) on the lower portion of the turntable. Oscillating gear (4) is mounted off-center so it will describe an eccentric action as it is being driven by the turntable gear. The tone arm moves in towards the center of the record and the repeated action of oscillating lever (55) keeps friction lever and weight assembly (47) from coming in contact with the copper bronze strip on trip switch assembly (63) as the pickup arm moves slowly towards the spindle and lead-in grooves. During the first revolution of the turntable, in the eccentric cycling grooves, the pickup arm advances rapidly and friction lever and weight assembly (47) is moved forward fast enough so that oscillating lever (55) does not halt its progress, therefore, friction lever and weight assembly (47) contacts the copper bronze trip contact on trip switch assembly (63) grounding it and making a complete circuit. This actuates solenoid (61) causing the changer to cycle.

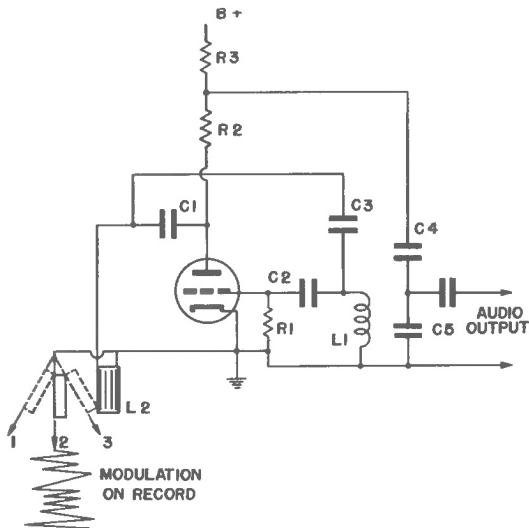
THEORY OF THE COBRA RADIONIC PICKUP

The operation of the Cobra pickup is considerably different from Crystal and Dynamic pickups. These pickups generate audio power, while the Cobra controls power generated by a radio frequency oscillator, detector and audio amplifier. The oscillator operates at a frequency of 2.5 Mc. Modulation is accomplished by changing the energy losses in a tuned circuit. These losses may be represented by an equivalent resistance in series with the reactance of the coil. The ratio of the resistance to the reactance determines the effi-

ciency or Q of the coil. The amplitude of the RF voltage developed across this coil by an oscillator will vary with changes in Q.

The grid coil L1 and other components of the oscillator are mounted in the oscillator pre-amp chassis, while the plate coil L2 is in the needle cartridge with vane and needle assembly. The coil is fixed and has 40 turns of No. 40 wire (approximate DC resistance 2 1/2 ohms). The stainless steel vane, which is in the field of the coil, is spot welded to the osmium-iridium tipped stylus.

Any movement of the stylus will cause a corresponding movement of the vane. As the stylus and vane follow the modulations in the record, changes in the mutual inductance between the vane and coil occur. In position 2 the vane is at rest, and a constant RF voltage appears across the plate coil. As the vane is set in motion and reaches position 1, it is at its greatest outward swing from the coil, resulting in low mutual inductance, low reflected resistance, higher Q, and a higher RF voltage across the coil. In position 3 it is at its greatest inward swing, resulting in a high mutual inductance, high reflected resistance, lower Q and a



Simplified Circuit of Oscillator

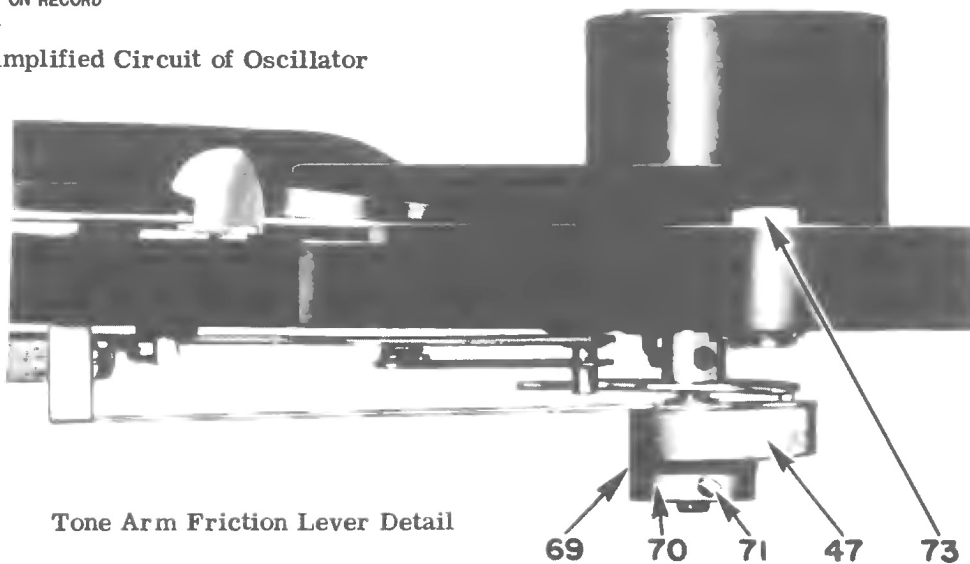
ZENITH Record Changer

lower RF voltage. It can be seen that the amplitude of the RF voltage which appears across the coil will vary with changes in Q, satisfying the condition for amplitude modulation. The position of the vane changes both the Q and L of the coil. Changes in L shift the frequency slightly, and a certain amount of frequency modulation is present, but since there is no frequency discrimination it remains undetected. Since the grid and plate coils are part of a single tuned circuit, any variations of amplitude of the RF voltage brought about by the changes in Q across the plate coil will also appear across the grid of coil L1, causing a shift in the average plate current through the plate load resistor across which the audio output voltage is developed. Plate bend detection takes place since only the positive half of the grid swing causes an increase in the average plate current. These changes in the average plate current appear as audio voltage across the plate load resistor.

The 2.5 Mc RF voltage and the audio voltage both appear at the plate (pin 6) of the oscillator triode. R2, C4 and C5 filter out the RF voltage allowing only the audio component to the grid (pin 4) of the amplifier triode where it is amplified, fed through a shielded lead to the audio amplifier of the receiver and reproduced by the loud speaker.

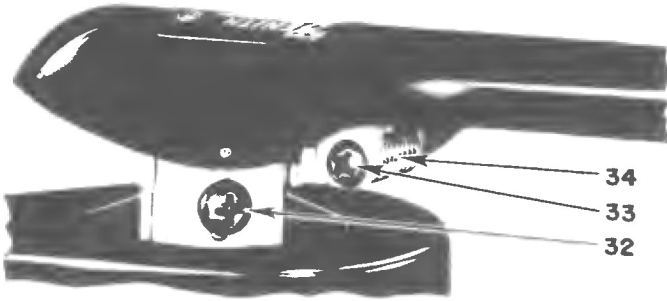
SET DOWN ADJUSTMENT

When adjusting the tone arm for proper set-down on the edge of the record, move set-up change lever to 7" position, place a 7" record on the turntable, turn the record changer through cycle by rotating the turntable by hand. Watch closely where the needle point of the Cobra cartridge lands on the record and adjust tone arm set-down adjustment screw (33) until proper landing position is obtained.



Tone Arm Friction Lever Detail

ZENITH Record Changer



Tone Arm Set-Down & Height Adjustments

TONE ARM HEIGHT ADJUSTMENT

The tone arm height adjustment determines vertical rise of the tone arm. If the tone arm does not rise sufficiently it will not play a full stack of twelve records. On the other hand, if the tone arm raises too high it may hit the records resting on the record shelf. Set the tone arm height adjustment screw (32) so that the needle clears twelve unwarped records on the turntable. The tone arm housing must not hit the under side of the records on the record shelf when the changer is cycled after adjustment.

SLAB HEAD SCREWS

For maximum rigidity many components are locked into position with slab head screws. This type set screw provides a more positive grip. The slab head set screw wrench is available as part number 68-8.

SPEED INDICATOR ADJUSTMENT

It is possible that the speed of the record changer may not conform to the speed stop on escutcheon (23). Proper adjustments can be made in the following manner. Put a stroboscopic disc on the turntable, adjust speed change lever (18) until the turntable is turning at exactly 78 RPM. Stop the record changer by pulling the AC plug, remove the turntable, loosen the two adjusting screws (74) and move speed change lever (18) so that the point on the control knob indexes exactly at the 78 mark on the escutcheon (23). Then re-tighten adjusting screws (74) and replace the turntable. The turntable should now rotate at exactly 78 RPM, however, as a precaution, again check with the stroboscopic disc.

SPINDLE

The spindle on this record changer is composed of five separate parts: Spindle shaft (30) and ejector cam (29) are pressure-fit together and if either breaks, they cannot be replaced since the assembly operation is a machine operation. The spindle housing is composed of two separate portions which once again are pressure-fit together and require a machine operation for assembly. It is possible that spindle cap (31) may be

pulled off spindle assembly (72) and if this does occur, it can easily be replaced by sliding a new spindle cap down over the spindle and then pressing in on the detent portion, which acts as a stop to keep the spindle cap from sliding off spindle (72). If breakage occurs other than loss of the spindle cap (31), the entire spindle assembly (72) must be replaced.

