

# Developments in automatic record changers

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**D**URING 1930, a total of 155,400 radio-phonograph combinations, with a sales value of \$34,188,000 were sold. The number of automatic record changers included in this total is estimated at 15,600. The development of home-recording devices in connection with radio-phonograph combinations did not appreciably change the outlets or totals sales for this equipment. The drop in sales of radio-phonographs in 1930 from the total of 238,000 units sold in 1929, cannot be attributed to a lack of the public's interest in phonograph records as a source of entertainment, but was due to the same economic factors that affected the whole radio industry.

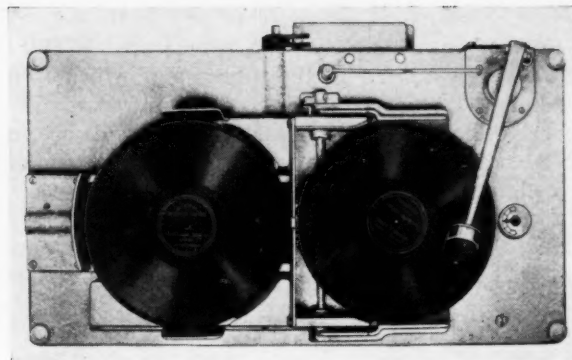
A study of the average price trend alone for radio receivers during the past three years would indicate a rather uncertain outlook for radio-phonograph combinations as to volume sales, if this were the only factor to be considered. Fortunately, there are others pointing to a more optimistic outlook for such combination units during the coming year. The most important is the automatic feature which is now being more widely recognized as a medium for exploitation.

A new recognition for these units is also being found in country clubs, hotel lobbies, steamships, pavilions,

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**WITH 4,500,000 obsolete radio sets in homes, the replacement buyer will look with a discriminating eye for some important additional feature before parting with his present set. This feature may be the automatic record-changing unit.**

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Capehart model (18-H) will play ten to fourteen 10-inch records, both sides (20-28 selections), continuously without refilling magazine

bowling alleys, poolrooms, etc., where reliance on the radio alone for a continuous source of musical entertainment is not practical. Record changers of the earlier types are not new to this field, but sales have been restricted due to the former high prices of such equipment.

The addition of an automatic record-changing feature to a radio creates an immediate impression of superiority over machines not so equipped, so that tone quality, selectivity, etc., are taken somewhat for granted in comparison to other units. This appears to be the buyer's reaction to equipment now available. Up to the present, however, sales of such equipment have been limited to a class market. This is due to the high price of such combination units in comparison to a radio receiver alone.

## Additional features for new radios

With the development of radio sets at the crossroads as to future design from a price viewpoint, the opportunity for popularizing automatic record-changing units in the better class of such equipment, has an excellent chance for success. The liquidation of development costs, and larger production, has now made available record-changing equipment that might well be incorporated in radios for a much wider market. An important factor that might also be considered is the replacement of some 4,500,000 obsolete sets now in the hands of the public. It is true that first purchasers of present-day radios look with favor on the cheaper units, but a percentage of the replacement buyers will look with discrimination for some *important additional feature* before parting with their present sets. That additional feature must stand out, and might well be the automatic record-changing unit.

The owner of an antiquated radio set is only going to part with his present equipment when the new sales appeal also fits into his idea of effortless entertainment. Over a period of years, radio has trained the public to accept the luxury of automatic music. One need only to tune in a station and sit and listen. It eliminated the necessity of jumping up every few minutes to change a record, which is present in non-automatic record-changing units. This may partially account for the smaller percentage of sales of radio-phonograph combinations in comparison to the total sales of sets during the past two years. However, it must be admitted that the price range has been a guiding influence in mass consumption during this period. The introduction of the midget set has been an important factor in this regard.

With better stabilized economic conditions, it is be-

lieved that a steady development and demand for radios combining the automatic record-changing feature will thrive. It has been said that the mass of the public owning cars selling for more than \$1,000 were originally Ford owners. This may be analogous to the replacement set business which is now in the offing, representing many millions of obsolete radios. A demand on the part of the public for something more than a cabinet with a minimum-priced radio, will offer an opportunity for greatly increased sales of automatics. This will allow an increase in the unit sale price of radios and a larger margin of profit on every unit.

### Minimum number of records required

Record-changing equipment at present available will handle up to 10, and in some units, up to 24 records. Ten records have now been generally accepted as the minimum number to furnish the desired continuous program for automatic changers.

A record changer made by the Allen-Hough Carryola Company will handle ten 10-in. or eight 12-in. records, playing on one side only. The motor supplied with this unit is a shaded pole induction type with an integral governor manufactured by General Industries Company. It is designed for operation on a 110-volt, 60-cycle current, furnishing 15 inch-ounces torque at 80 r.p.m.

Any standard pick-up can be furnished either terminating in leads, or through tip jacks, or with volume control on record-changer with tip jacks for input to amplifier. Provision is made for repeating any record by manually lifting the arm carrying records. Rejection of a record is accomplished by moving pick-up to end of record. This machine can also be provided with switch for operation with coin-operated mechanism.

### Capehart introduces two models

The Capehart Corporation has brought out two models of record-changers. One model, designated 10-12C, will handle ten 10-in. or ten 12-in. records playing on one side only, and a second model (18-H) designed to handle ten to fourteen 10-in. records, playing on both sides. This latter instrument will thus play 20 to 28 selections continuously without further attention. These units have also been combined in eight different cabinets, some with the record-changer unit only and others complete with radio.

In the 10-12C model, the last record repeats until the records are re-stacked or the master switch is shut off. Any record can be repeated by raising the record magazine to a perpendicular position. The chassis is also equipped with a reject and record-unloading lever. The master switch for starting the mechanism and a volume control are mounted in the right front corner of the mounting plate. No oiling is required on this unit, except for the turntable motor. Other principal moving parts that would require oiling, have oil-less bushings installed. This unit, while designed to accommodate the Capehart pick-up, will also accommodate any of the standard types by special adaptations furnished.

A unique feature of the pick-up connections is the method of eliminating needle scratch during record-changing operations. The leads from the pick-up are carried to two terminals mounted on the trip switch plate on the underside, and are so arranged with the cut-out switch that when the pick-up reaches the stop groove of a record, the pick-up is cut off from the amplifier. No needle scratch is thus transmitted while the pick-up is in the change groove, and before it is lifted off the record.



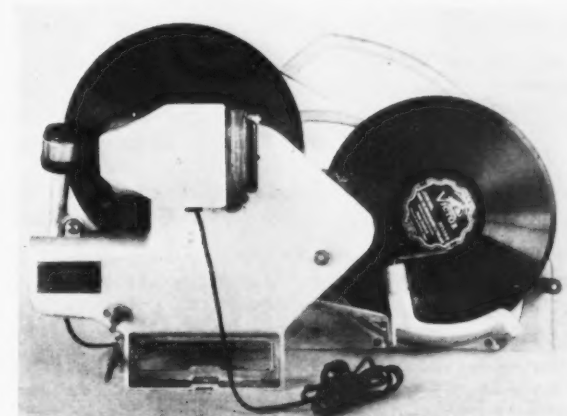
Junior model (10-12 C) record changer brought out by the Capehart Corporation, requiring small space



Record changer designed by Allen-Hough Carryola Company, handles up to ten records



Compact record changer handling ten records designed by Electromatic Record Changer Corp.



Record changer designed to play records in vertical position made by Hardray, Inc., N. Y. C.

This unit is also designed so that with a double-throw master switch, provided at some convenient location, when it is desired to shut off the phonograph, it will finish out the record partly played and return the tone-arm to the extreme outside or open position. This will allow records to be changed without touching tone-arm by hand. It is accomplished by having a special switch mounted on the cam shaft, which automatically stops the machine in the wide open position.

When it is desired to repeat any particular record which is being played, the magazine arm can be raised and it will then keep repeating the record on the turntable until the current is shut off or the magazine arm is placed in the operating position again.

The Electromatic Record Changer Corporation, Chicago, has developed a rather compact unit which will handle ten 10-in. records. It repeats any record when desired, and has a record rejector permitting change of any selection if desired. The motor of this unit is suspended on an adjustable sub-base below the mounting plate. The time required for record change is given as five seconds. With this unit is also included pick-up, volume control and starting switch.

The White Engineering Corporation has also developed a rather compact unit that will handle twelve 10-in. or nine 12-in. records. All controls are on the face of the cabinet; it is thus not necessary to raise top of cabinet after loading to control operations. A reject button on the front of the cabinet, will, when pressed, reject record playing and start another one if desired. A re-

peat knob is also provided for repeating any record in the magazine. In order to eliminate slippage when 12 records are stacked on turntable, the records are held together under pressure by means of a record arm in such a way that the top record, on which the pick-up rests, can not slip and thus vary its speed relative to turntable.

A feature of the record changer made by Hardray, Inc., is the vertical position of the records while playing. Twenty 10-in. records of any make can be played continuously in this machine without reloading magazine. This unit allows freedom in cabinet design in that a standard open top type of cabinet, a closed top cabinet with a side loading door or a front opening door may be used.

This record changer has a single control knob which when pushed starts the machine. If a record is playing and one does not want to wait until it finishes, pushing this knob will reject the record. Turning the same knob to the right changes the operation to repeat the record being played, and turning it to the left, returns it to the normal record-changing operation.

Among some of the record-changing units which are sold only complete with cabinet, is one designed by the Western Electric Piano Company, Chicago, Ill. This instrument will handle up to 15 records, playing both sides. It is also provided with remote control. An interesting use has been made of this unit in connection with a centralized radio control cabinet designed by the same company. Phonograph record programs can be

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### Specifications for automatic phonograph record changers

Manufacturer	Model number	Driving motor*	Number records handled	Speed regulation	Turntable drive	Time required record change	Record-changer dimensions inches	Type of pick-up	Special Features
<b>Allen-Hough Carryola Co.</b> Milwaukee, Wis. ....	Models 4, 5	General Industries Co. commercial voltages available	Ten 10 in. or eight 12 in.	Governor built into motor	Rubber friction disk	15 seconds	Length 13½, width 14½, ht. above mtg. 9½, ht. below mtg. 3½	Any standard type furnished	Has repeat mechanism. Repeats last record until stopped.
<b>The Capehart Corp.</b> Fort Wayne, Ind. ....	10-12 C.	Shaded pole induction type	Ten 10 in. or ten 12 in.	Governor on motor	Friction disk	18 seconds	Length 14½, width 14½, ht. above mtg. 7½, ht. below mtg. 3½	Capehart or special as required	Record reject and unloading lever. Can repeat any record. Cabinet models also available.
do.	18-H	1/30 H.P. split phase change motor or Friction driven turntable motor	Ten to fourteen 10 in. play both sides	Governor on motor	Friction disk	20 seconds	Length 27½, width 14½, ht. above mtg. 12, ht. below mtg. 7	Capehart or special as required	Device for reject and button control for remote installation. Cabinet models also available.
<b>Electromatic Record Changer Corp.</b> 2212 South Paulina St., Chicago, Ill. ....		General Industries "Blue Flyer," special	Ten 10 in.	Governor on motor shaft		5 seconds	Length 19½, width 14½, ht. above mtg. 4½, ht. below mtg. 4½	Own make	Record reject mechanism. Repeats any record.
<b>Electra Corporation</b> 1500 North Kostner Ave., Chicago, Ill. ....		Two motors used disc and changer	Twenty-four 10 in. play both sides	Mechanical governor	Direct drive	7 seconds	Length 27½, height 25, depth 14½	Own make	Two cabinet models available, unit also sold separately.
<b>Hardray Inc.</b> 644 Broadway, New York, N. Y. ....		General Industries "Green Flyer"	Twenty 10 in.		Friction disk clutch	11 seconds	Length 22, width 11½, height 14	Webster type 4-C.	Records played in upright position. Chassis aluminum casting. Weight 22 lb.
<b>White Engineering Corp.</b> 32nd and Arch Sts., Philadelphia, Pa. ....	Phonomatic	General Industries	Twelve 10 in. or nine 12 in.	Mechanical governor	Silent worm gear	12 seconds	Length 13½, width 14, height 9	Webster high impedance	Record reject button. Repeat any record desired. Controls on face of cabinet.

\* 110 volt 60 cycle; Turntable speed 78 r.p.m. unless otherwise specified.

## Developments in automatic record changers

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arranged for playing 5, 10, 15, 20, 25, 30 minutes, or up to a full two-hour period automatically. This cabinet has distribution facilities for phonograph, radio and microphone through 21 separate loudspeaker connections.

The record-changing unit incorporated in the Stromberg-Carlson radio-phonograph combination, has several unique features. This unit is sold only complete with the radio set. It will handle from 12 to 14 of the 10-in. or 12-in. records, or a mixture of both of these sizes can be played automatically with one filling of the magazine.

Two motors are employed—one for operating the turntable, and the other for the record-shifter mechanism. Both motors are of the induction type for use on an a.c. supply. The turntable speed is controlled by a centrifugal type governor, and is positively driven through a worm-gear reduction. The complete time required for changing records averages 16 to 18 seconds. This period is to give deliberate reliable movement to the mechanism, to insure handling records in various conditions of wear or warping, without possibility of jamming or interference with the continuous operation of the mechanism.

Provisions are made in the wiring to allow remote control of motors and switching of radio set to phonograph operation when desired. Remote control is not included as regular equipment, but all the electrical and mechanical connections are made for adding remote control when desired.

### Two classes of equipment may evolve

What the ultimate list price should be for radio sets combining the automatic record-changing feature, in order that volume sales to homes will result, depends on the differential between present cabinets *sans* such equipment and those having this feature. Perhaps experience only will set the limits of this differential, but a review of a limited number of dealers indicates that the complete set should list around \$200 to reach a large market. This naturally means that two classes of such equipment will evolve, that selling around this figure and units selling much higher, combining additional refinements for a class market.

In spite of the fact that record-changing units have been available some time, the majority of the public still associate such equipment with custom-built sets or coin-operated devices only. Wider publicity during the coming year will develop a consciousness on the public's part of the practicability and usefulness of this equipment in the home.