

Understanding the WIRE RECORDER

**An explanation of details
and functions of the various
parts of a typical recorder.**

By

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Assoc. Editor, RADIO NEWS

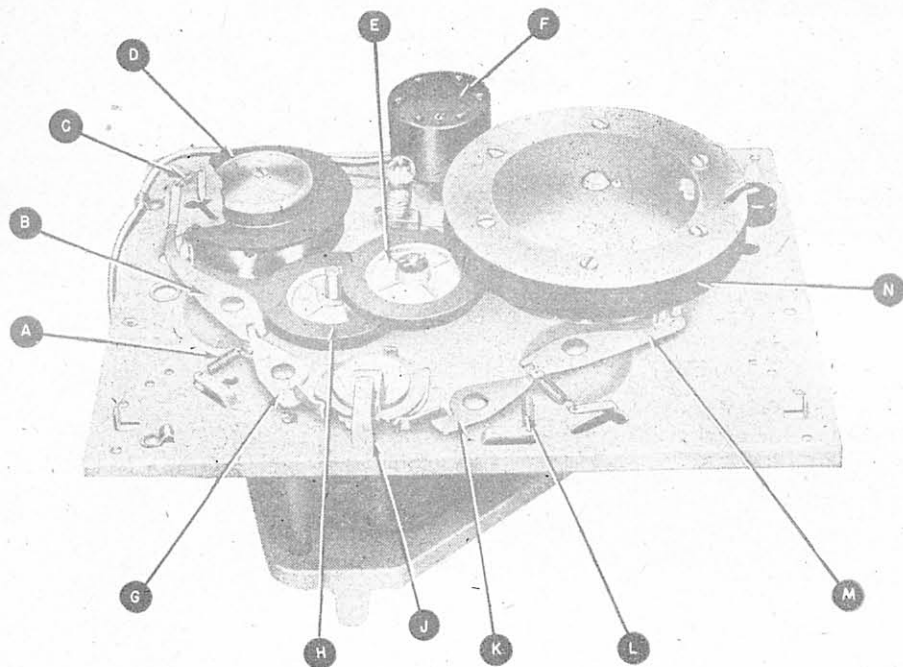


Fig. 1. Webster Model 80 wire recorder mechanism. Keyed parts are as follows: (A) "Heavy" brake spring on supply spool; (B) Brake lever; (C) "Light" brake spring on supply spool; (D) Supply spool; (E) Idler wheel; (F) Head; (G) Brake actuating lever; (H) Motor shaft and drive wheel; (J) "Operate" switch and lever; (K) Brake actuating lever; (L) "Heavy" brake spring on takeup spool; (M) Brake lever; and (N) Takeup spool.

IN general, the basic principles of all wire recorders are identical. While there are many possible variations, essentially a system consists of a supply spool for the wire, a recording-bias-playback head, a take-up spool, and a mechanical means for transporting the wire from one spool to the other, the direction of wire travel depending on whether recording, playback, or rewind is desired.

Many different mechanical arrangements are used to accomplish these functions. These arrangements vary widely with different manufacturers' ideas. Some use elaborate systems employing dual motors, independent heads for recording and playback, automatic shutoffs in the event of wire breakage, electrically operated brakes, etc.

The tentative standards for wire travel have been set at two feet per second for recording. Some units use a capstan drive to insure that the wire travel is exactly this speed irrespective of the amount of wire remaining on the spools. However, it is general practice to transport the wire by driving the takeup drum at a constant speed. Due to the small variation in speed of wire travel by this method, this type of drive has been adopted by the majority of the manufacturers of popular priced units.

A typical unit of this type is the Webster Model 80 wire recorder. This unit uses a single motor for both re-

cording-playback and rewind. The motor is mounted by means of pivots, permitting it to engage either the

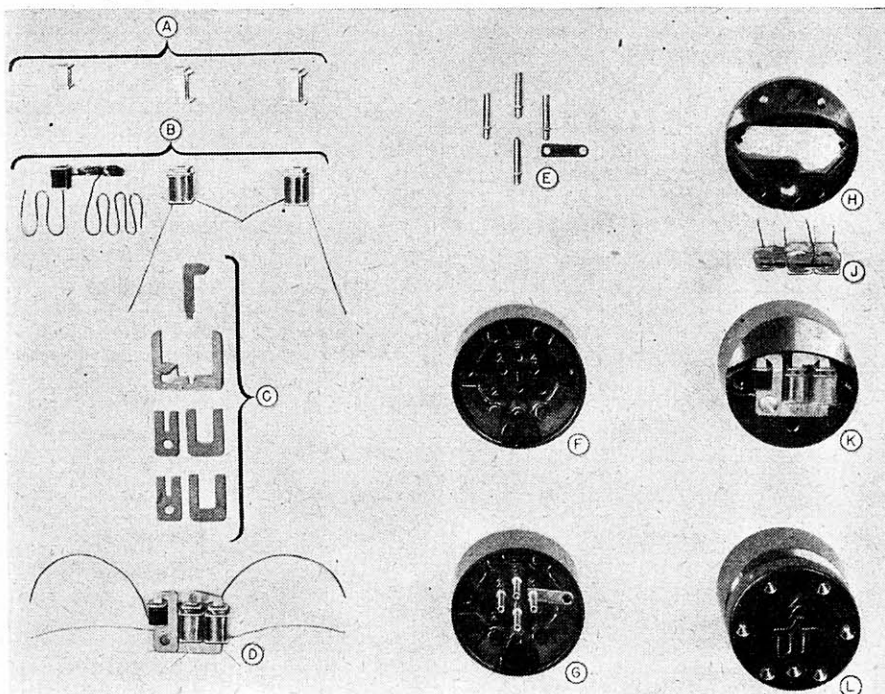
takeup or rewind drum, simply by shifting a lever. As a result of the proper choice of idler diameters, the rewind speed is approximately seven times that of the recording speed, permitting rapid rewinding.

A combination head is used for recording, bias, and playback. Details of this head are shown in the exploded view in Fig. 2. The head is equipped with a plug-in arrangement, which permits the rapid replacement of heads for servicing. The head travels up and down during the operation of the machine, to level wind the wire on the spools.

A view of the recorder mechanism with the cover plate removed is shown in Fig. 1. With the "operate" switch *J* in neutral position, the motor, with its drive wheel, is disengaged from both

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Fig. 2. Exploded view of combination head. Parts shown include: (A) Winding bobbins; (B) Wound bobbins; (C) Laminations; (D) Completed head assembly; (E) Contact pins and ground strap; (F) Lower half of case; (G) Lower half of case with pins; (H) Upper portion of head and shield plate; (J) Head assembly ready to install; (K) Head assembly installed in lower half of case; and (L) The completely assembled head.





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Wire Recorder

(Continued from page 43)

drives. The motor is held in this neutral position by means of springs. When the operation control is thrown to the "run" position, the motor is shifted by means of a cam arrangement, so that the motor shaft makes contact with the idler wheel *E*. This idler wheel *E* is supported by a bracket which is free to move in a lateral direction. Because of the pressure of the motor shaft the idler wheel is forced against the drive drum of the takeup wheel *N*. Through the reduction obtained by this arrangement, the takeup drum is driven at the proper speed to pull the wire at two feet per second.

When the "operate" switch is thrown to the "rewind" position, a cam on its shaft shifts the motor so that the rubber drive wheel mounted on its shaft makes contact with the supply drum *D*. Due to the difference in size between the motor shaft and the rubber drive wheel fastened to this shaft, the rewind speed is approximately seven times the "run" speed.

An ingenious "memory" brake is used in conjunction with the "operate" switch. When this switch is thrown to the "run" position, a felt pad brake on arm *M* is removed from the takeup drum, permitting it to rotate freely, being retarded only by the friction of the idler wheel *E*. The same operation puts a light brake on the supply drum *D*. When the switch is returned to "neutral," a light brake is applied to the takeup drum and a heavy brake applied to the supply drum.

With the switch in the "rewind" position, the brake is removed from the supply drum and a light brake applied to the takeup drum. Returning the switch to neutral leaves a heavy brake on the supply drum and a light brake on the takeup drum.

This type of braking system insures that the machine will not allow slack in the wire with its attendant danger of fouling, when the switch is returned to "neutral" from either the "run" or "rewind" position. Control of the braking sequence is accomplished by means of an auxiliary cam mounted concentrically with the cam which controls the motor shifting.

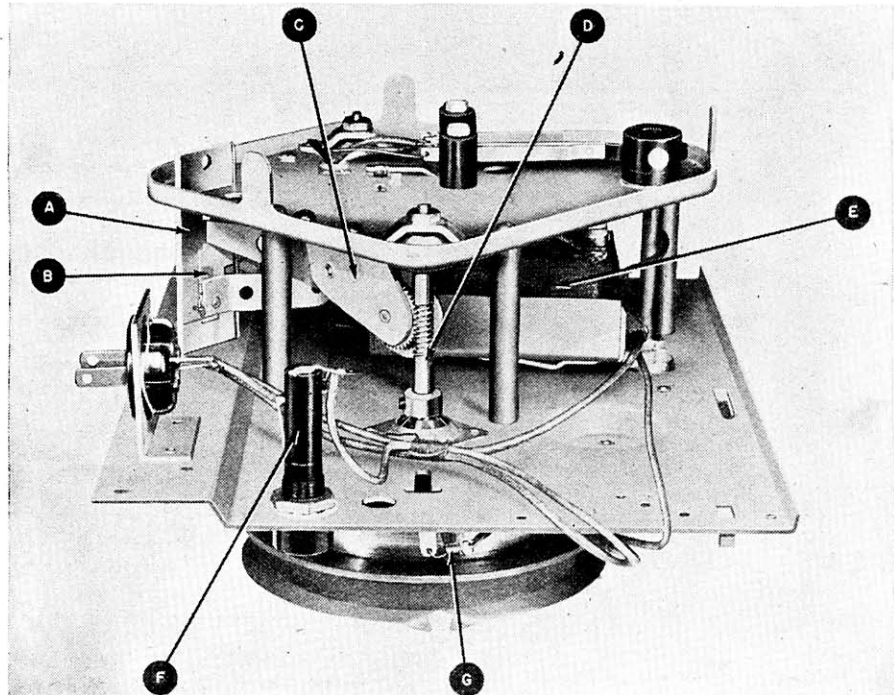
The shaft which supports the takeup drum also carries a worm gear, used to raise and lower the head which in turn acts as a level wind for the wire. Details of this level wind are shown in Fig. 3. This worm *D* drives a pinion mounted on a bracket *C*, and fastened to a shaft which carries a cam. Through this cam and lever *B* the head supporting bracket *A* is alternately raised and lowered.

As the wire passes through the head in operation, the wire is wound in even layers on the spools, and the danger of pileup and tangling of the wire is thus eliminated.

An additional cam is fastened to the lower end of the shaft which carries the operate switch. This cam operates a motor switch, turning on the motor in either "run" or "rewind" position. An additional set of contacts on this switch opens the leads to the bias winding of the head in the "off" and "rewind" position, to prevent accidental erasing of the wire.

Two bakelite buttons are mounted on either side of the "operate" switch

Fig. 3. Bottom view of recorder mechanism. Parts shown are (A) Head actuating arm; (B) Head actuating lever; (C) Pinion gear bracket; (D) Worm gear and takeup drum shaft; (E) Motor; (F) Extractor type fuse post; (G) "Light" brake spring on takeup drum.



to prevent accidental overswing of the switch when it is returned to "neutral" from either the "run" or "rewind" position. These buttons must be depressed in order to permit the "operate" lever to be moved from its "neutral" position.

The exploded view of the recording head, Fig. 2, shows the various parts which go to make up the head. The laminations used are a special high permeability alloy, annealed after punching. The essential components of the head are shown in assembled form in the lower left of the photograph. The small coil on the left is the erase coil and is connected to the supersonic oscillator in the unit. As the wire travel is from left to right across the head, this coil acts to erase any previous recordings from the wire. The voice coils are wound around the center and right hand legs, and consist of many turns of extremely small wire. The two smaller coils, which are wound at the upper end of these bobbins, are the bias coils and are connected in series with the erase coil. Their purpose is to introduce a supersonic bias on the wire during the recording operation.

The top edge of the laminations have a narrow slot cut lengthwise to accommodate the wire in its travel across the head. Due to the curved nature of these laminations and the manner of feeding the wire, the entire length of the wire in the head at any one time, makes contact with the magnetizing section of the head across the entire head. This method of feed makes certain that the wire will be evenly magnetized in proportion to the audio signal present. It is essential that the wire make good contact with the head during recording and playback to prevent variations in output which might be caused by a poor contact.

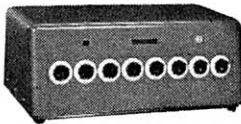
A small piece of high permeability metal is mounted in the upper half of the head case to act as a shield against hum pickup. Due to the low output of the head it is necessary to use extreme care in order to minimize any chance of hum pickup.

A novel feature is used in conjunction with the wire holding clip on the takeup drum. When the wire is placed under this clip the spring action of the clip holds the wire in place. The clip may be released by depressing the button in the center of the takeup drum. When the wire is rewound it is not necessary to watch the progress of the rewinding process as a slight curl is given to the end of the wire as it leaves the drum at the conclusion of the rewinding. This slight curl, plus the momentary tug on the wire as it leaves the clip, tucks the free end of the wire under the last turn of wire on the rewind spool. There is no danger of the free end of the wire becoming loose and fouling.

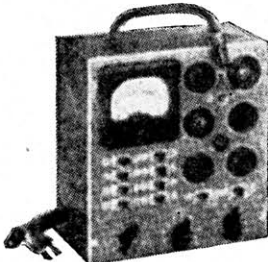
A pilot light is provided to illuminate the head and allow the progress of the wire through the head to be observed.

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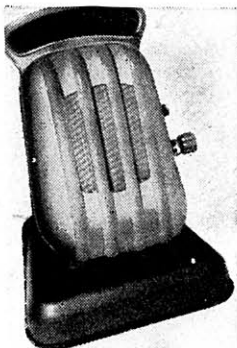
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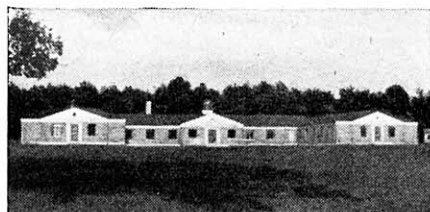
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