CONSTRUCTION OF A SEGMENTATOR

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Introduction

After having used our present segmentator with rather unsatisfactory results, the requirement for a segmentator with a more accurate time certainty with respect to the position of the segment arose. The development has gone on for a couple of months, and is now so advanced that it is possible to say that the principle will hold.

The principle of the segmentator

The segmentator consists of three principal components: a dual track loop-taperecorder, a programming unit and a gate.

The taperecorder is a Movic professional recorder taken over from The State Institute for Speech Defectives, Copenhagen.

The programming unit consists of an astable multivibrator connected to an electronic counter via a logical network of TTL integrated circuits from Texas Instruments. To the counter are coupled selectors by the help of which it is possible to select the position, duration, and shape of the wanted segment, just as the duration of the recorded sequence. The last mentioned selection is necessary in order not to exceed the maximum tape capacity determined by the length of the loop and the tape speed.

The mode of recording is as follows:

A push on the knob "Record" (see Fig. 1) will start the multivibrator (frequency 1 kcps), reset the flip-flops FF 1 and FF 2, reset the counter, lead the multivibrator signal to the record head of track 1, lead the input speech signal to the record head of track 2 by means of the relay and turn on the control lamp for recording. When the counter has

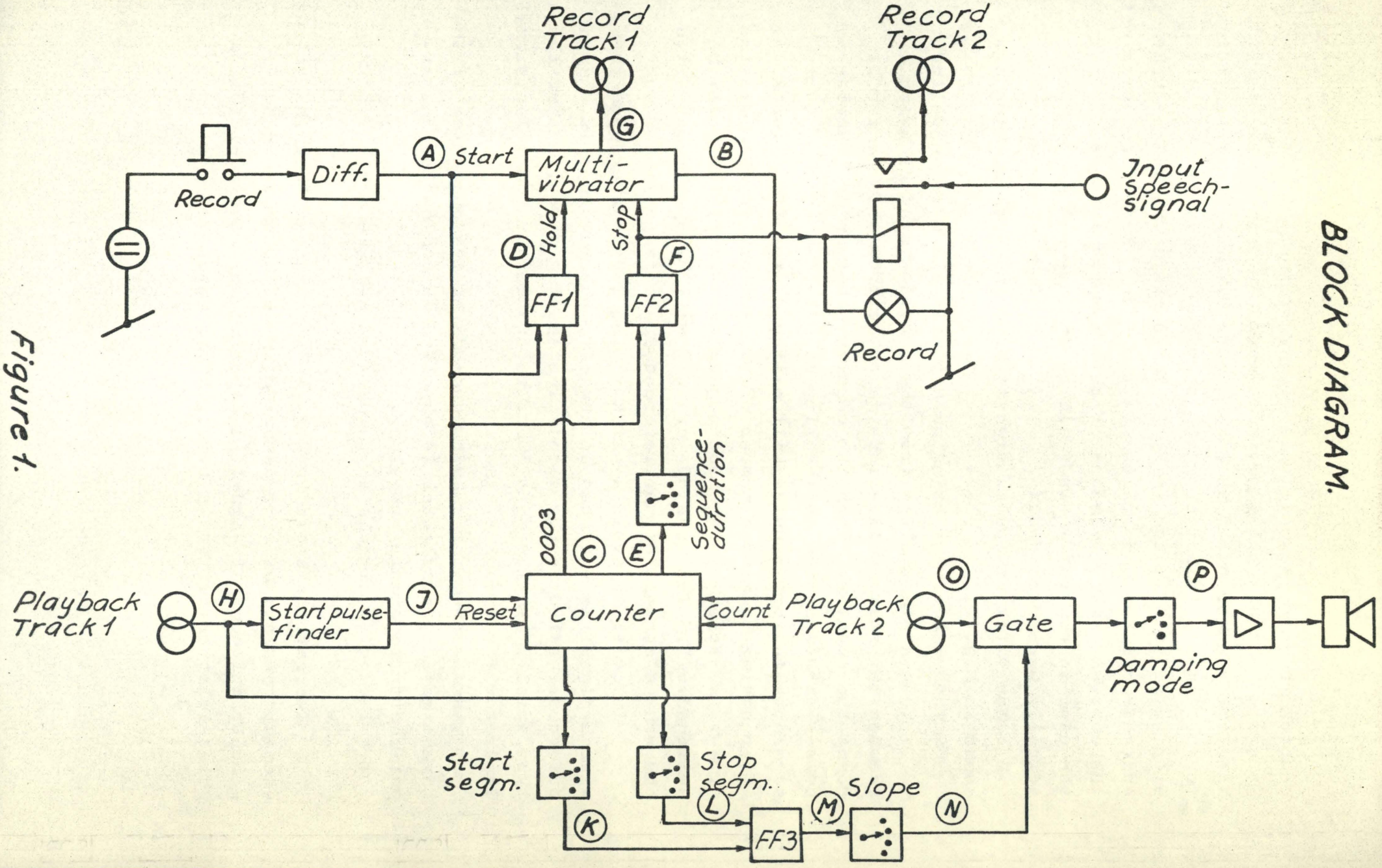

Figure 1.

BLOCK DIAGRAM.

counted three pulses, it will give a stop pulse to FF 1, which generates a start pulse of three msecs duration (see Fig. 2). When the counter has counted a number of pulses corresponding to the time t, selected by the sequence duration-selector, a stop pulse will be led to FF 2, which stops the multivibrator, switches off the connections to the record heads and turns off the control lamp. By means of this lamp it is possible for the user to control whether all he intended to record has actually been recorded.

The different pulse signals as a function of time are shown in Fig. 2.

The mode of operating when playing back is as follows:

When a start pulse from the playback head of track 1 reaches the start pulse-finder, a pulse from this unit will reset the counter. When the counter has counted a number of pulses corresponding to the time u, selected by the start segment-selector, a pulse will switch on the flip-flop FF 3. After having counted a number of pulses corresponding to the time v, selected by the stop segment-selector, FF 3 will be switched off. The envelope of FF 3 will be synchronous with the wanted segment of the recorded speech signal of track 2.

In order to avoid a click in the loudspeaker when the speech signal is switched on and off, the envelope is shaped before being led to the gate. The shaping circuit is of the type briefly mentioned in "Constructional Work on a Functional Generator for Speech Synthesis" in ARIPUC 3.

As the need for shaping depends on the character of the investigation, a selector is supplied which enables the experimenter to change the slope.

The pulse signals as a function of time are shown in Fig. 3.

The gate is shown in Fig. 4. It is seen that the gating element consists of a diode bridge. As the bridge needs a symmetrical control signal in order to hold the DC-level, a phase-splitter is put in front of the gate.

Pulse signals when recording.

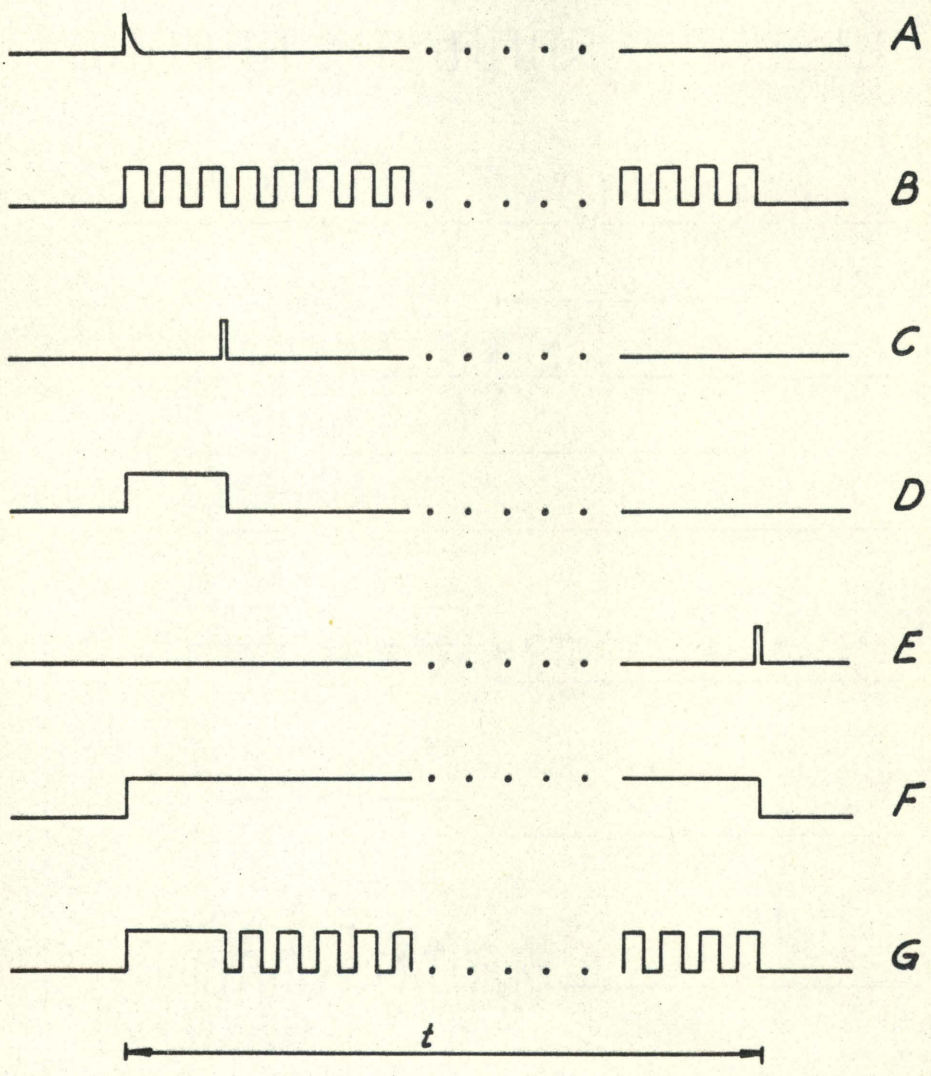

Figure 2.

Pulse signals when playing back.

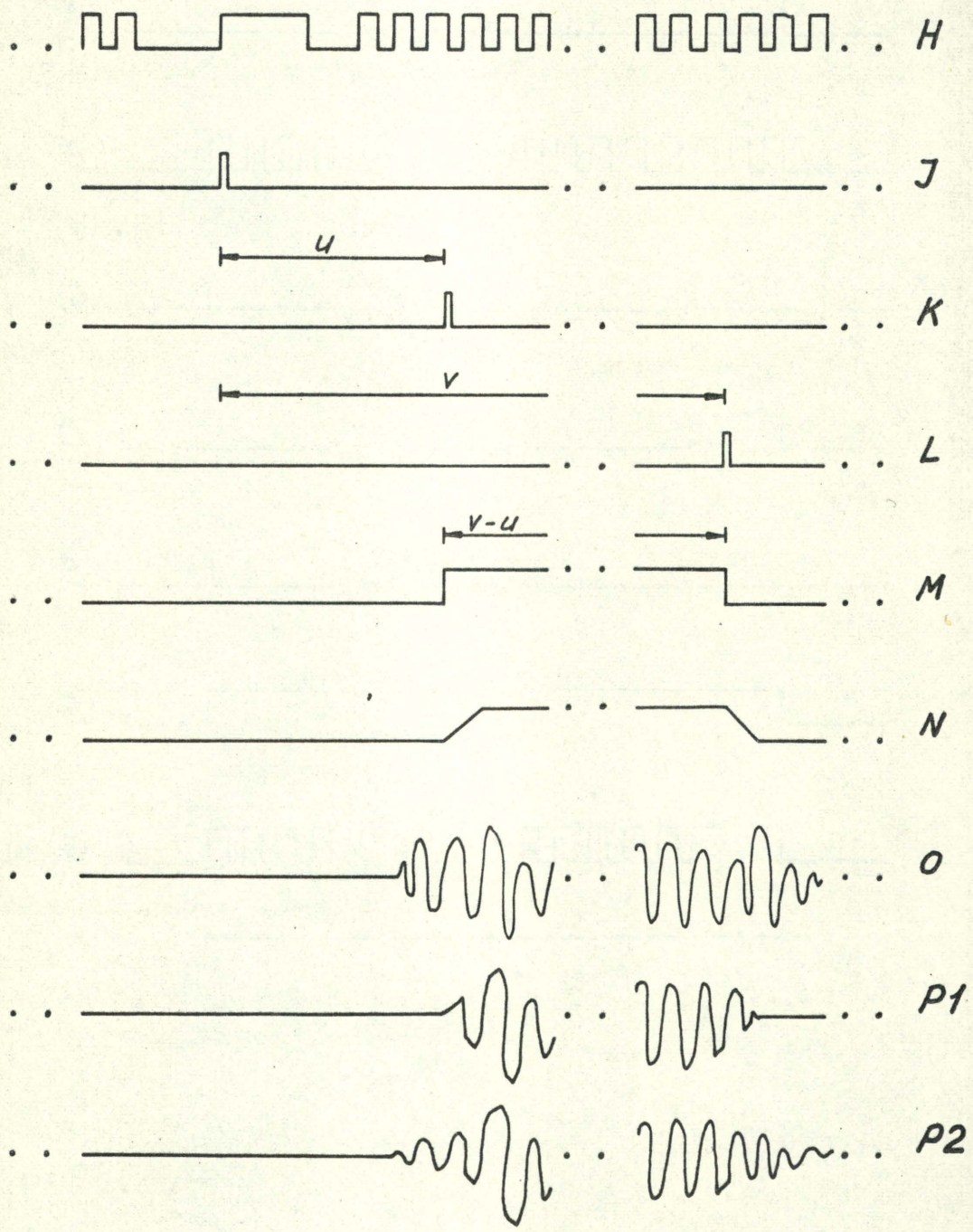

Figure 3.

GATE.

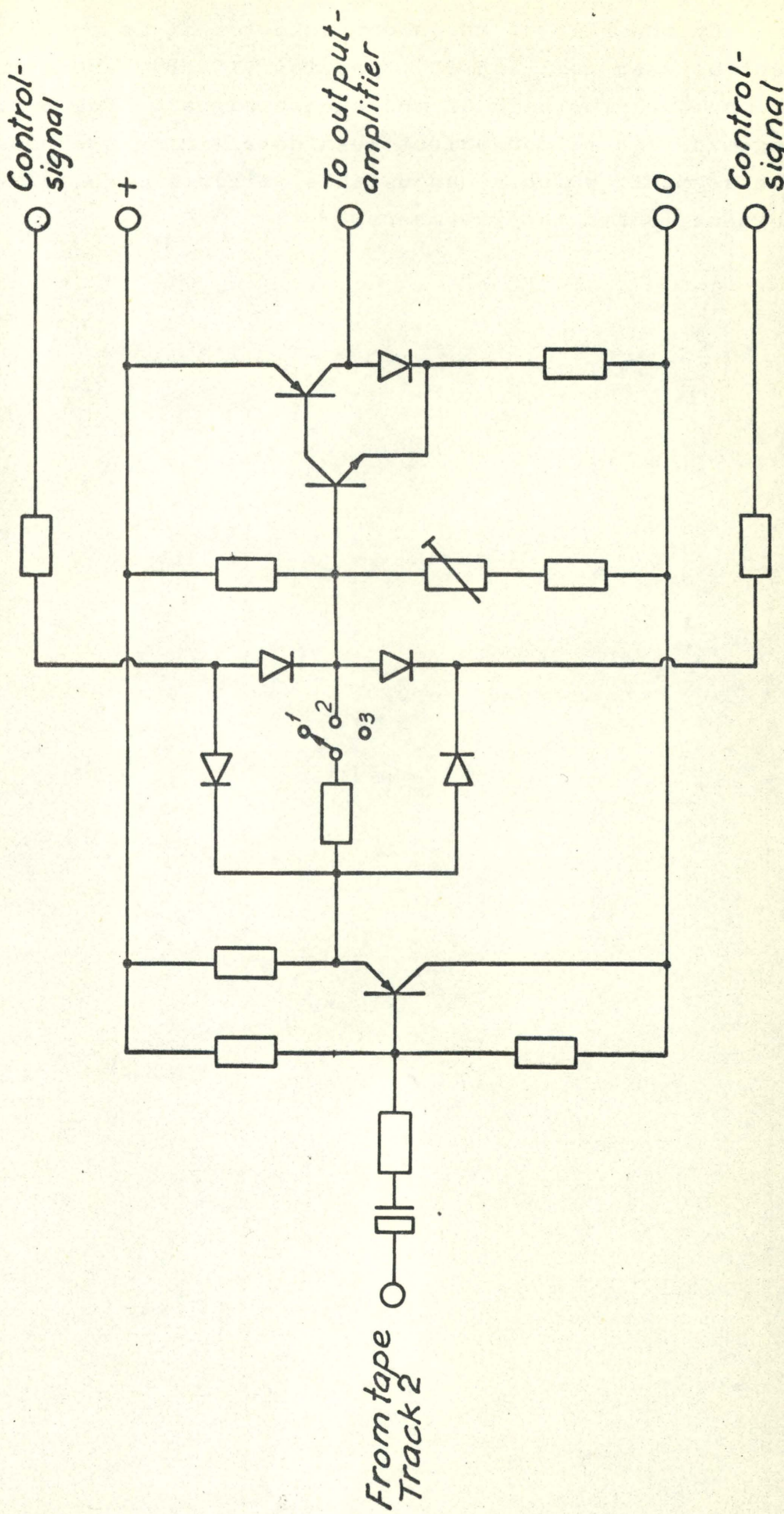

Figure 4.

By the help of the shown selector it is possible to select between full (45 dB), partial (15 dB), and no damping of the unwanted part of the speech signal. The partial damping-mode can be convenient when determining the position of the segment, which is adjustable within 1 msec. The maximum segment length is 9999 msecs.