

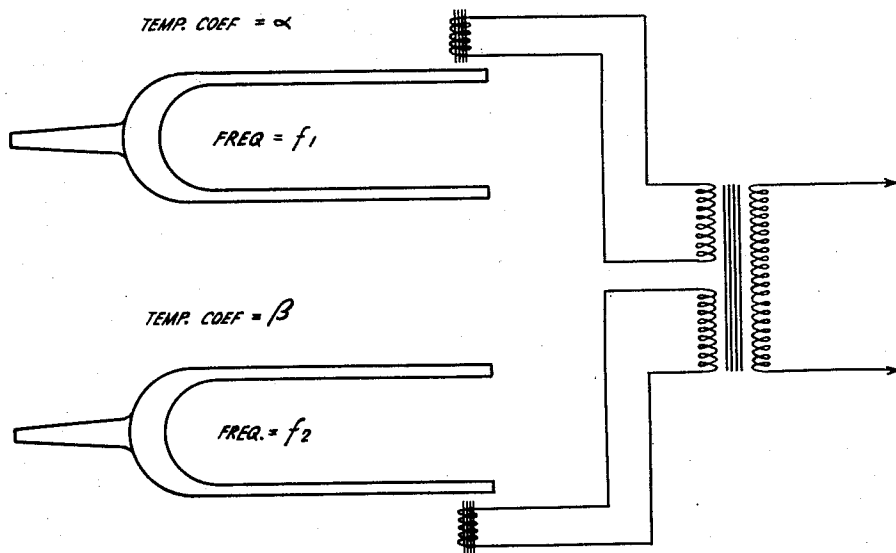
Nov. 17, 1931.

G. M. WRIGHT

1,832,345

TIME PERIOD DEVICE

Filed Oct. 21, 1929



INVENTOR
G. M. WRIGHT

BY

W. H. G. Over
ATTORNEY

UNITED STATES PATENT OFFICE

GEORGE MAURICE WRIGHT, OF GREAT BADDOW, CHELMSFORD, ENGLAND, ASSIGNOR
TO RADIO CORPORATION OF AMERICA, A CORPORATION OF DELAWARE

TIME PERIOD DEVICE

Application filed October 21, 1929, Serial No. 401,344, and in Great Britain October 22, 1928.

This invention relates to time period devices, and has for its principal object to provide a time period device which shall be substantially independent of temperature variations.

In cases where an extremely constant alternating current frequency is required, e. g., picture telegraphy, transmitted radio wave lengths, frequency standards, etc., one method of achieving the required constancy is to employ an electrically maintained time period device, such as a tuning fork, for the production of the alternating current.

At the present time such a generator can be constructed so that its frequency is practically independent of all disturbing factors save temperature. In certain applications, for example, single wave lengths working in broadcasting, trouble is experienced in maintaining a sufficiently accurate temperature control, and consequently it is desirable to obtain a generator which is independent of the temperature at which it is operating.

According to this invention, as shown by the single figure of the drawing, a time period device comprises two time period elements, the ratio of whose frequencies at a given temperature is substantially inversely proportional to their temperature coefficients, and the beat frequency between said elements (or a function thereof) is treated as the time period of the whole device.

In one form of construction a time period device comprises two electrically maintained tuning forks, and the beat between them is treated as the output frequency of the whole device. If the frequency of one tuning fork at a given temperature is f_1 , and its temperature coefficient is α , the frequency of the other fork being f_2 at the same temperature and its temperature coefficient being B , the forks are so made and are of such material that

$$\frac{f_2}{f_1} = \frac{\alpha}{B}$$

for example, one fork may be steel and the other brass, the latter being provided with small iron armatures on the tines in order that it may be maintained in vibration.

With this arrangement, assuming both forks to be subjected to the same temperature changes, if any, the beat frequency does not vary with such changes. This will be seen from the following proof:

At any temperature t above datum, the frequencies of the forks will be respectively $f_1 (1 - \alpha t)$ and $f_2 (1 - Bt)$ and the beat frequency at this temperature will be

$$f_1 (1 - \alpha t) - f_2 (1 - Bt) = f_1 - f_1 \alpha t - f_2 + f_2 Bt.$$

But

$$\frac{\alpha}{B} = \frac{f_2}{f_1}; \alpha f_1 = B f_2; \alpha f_1 t = B f_2 t.$$

Hence $f_1 - f_1 \alpha t - f_2 + f_2 Bt = f_1 - f_2 =$ the beat frequency at datum temperature.

Having now described my invention in one of its preferred forms, other modifications and changes will suggest themselves and at once become apparent to those skilled in the art to which it relates. I, therefore, believe myself to be entitled to any and all modifications falling fairly within its spirit and scope as set forth in the hereinafter appended claims; wherein:—

I claim:

1. A time period device comprising two time period elements the ratio of whose frequencies at a given temperature is substantially inversely proportioned to their temperature coefficient.

2. A time period device as claimed in claim 1 and comprising two tuning forks so arranged that if the frequency of one tuning fork at a given temperature is f_1 and its temperature coefficient is α , the frequency of the other fork being f_2 at the same temperature and its temperature coefficient being B , the forks are so made and are of such material that

$$\frac{f_2}{f_1} = \frac{\alpha}{B}$$

3. In a time period device, a plurality of tuning forks, one of said tuning forks having a temperature coefficient of α at a frequency f_1 , the other of said tuning forks having a

temperature coefficient of B at a frequency
f2 at the same temperature and a ratio of

$$\frac{f2}{f1} = \frac{\alpha}{B}$$

5

being established between the two forks,
means for independently driving each of said
forks, and a combining circuit for utilizing
the combined output energy from said forks.

10

GEORGE MAURICE WRIGHT.

15

20

25

30

35

40

45

50

55

60

65