June 2, 1953 W. R. HICKS 2,640,887

AUTOMATIC PAGING SYSTEM

Filed Oct. 31, 1951

Fig. 1.

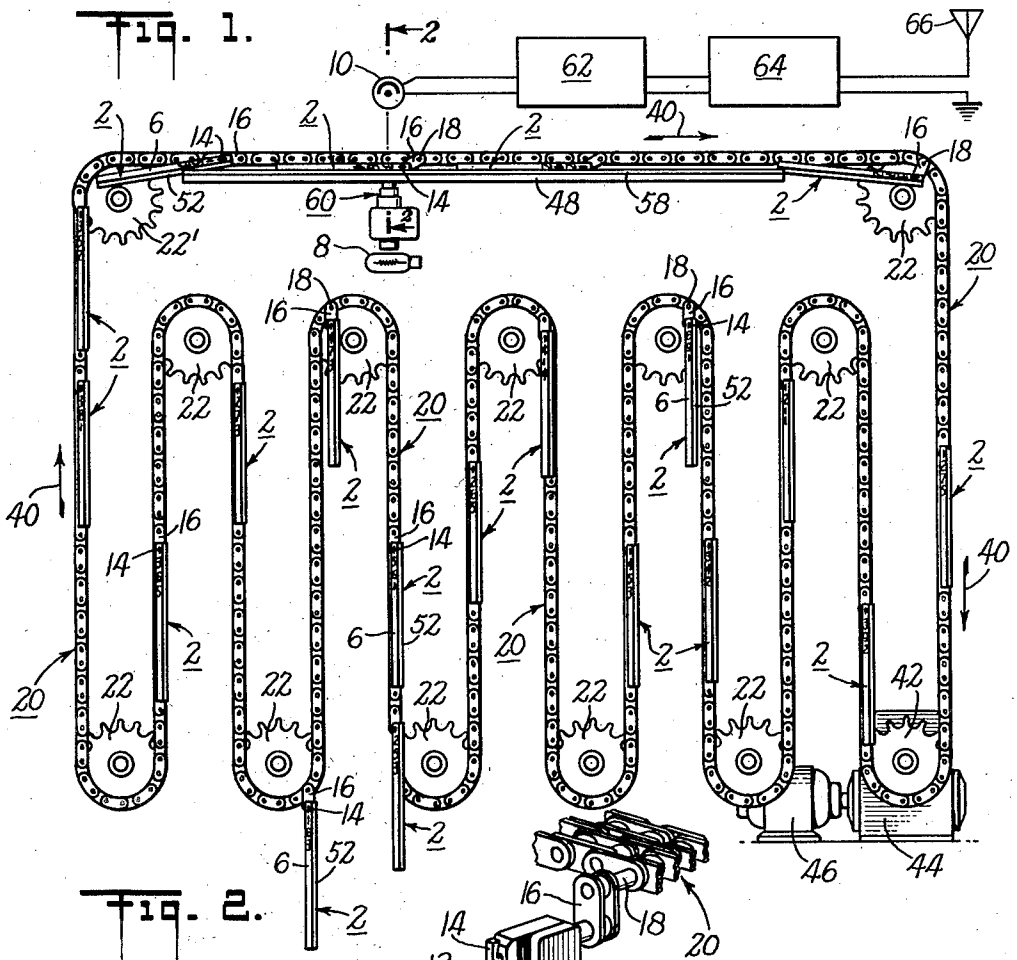


Fig. 2.

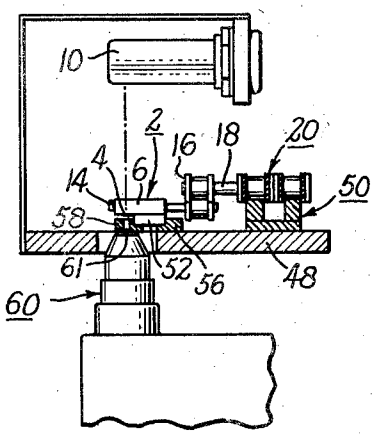
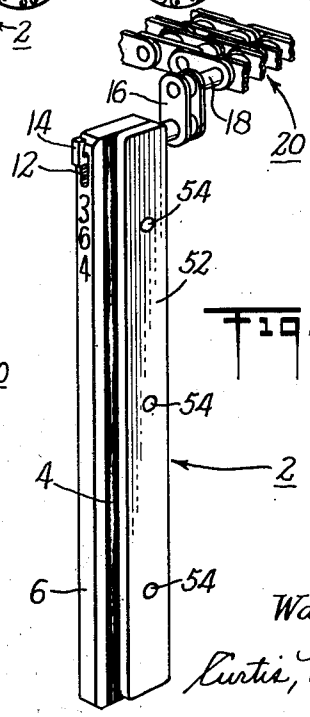


Fig. 3.



INVENTOR
Walter Robert Hicks
BY
Curtis, Morris & Safford
ATTORNEYS

Patented June 2, 1953

2,640,887

UNITED STATES PATENT OFFICE

2,640,887

AUTOMATIC PAGING SYSTEM

Walter Robert Hicks, Manhasset, N. Y., assignor, by mesne assignments, to Aircall, Inc., New York, N. Y., a corporation of Delaware

Application October 31, 1951, Serial No. 254,115

10 Claims. (Cl. 179—100.3)

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This invention relates to automatic paging systems, and more particularly to a transmitting system for broadcasting in continual cycles a series of coded call signals.

Such a transmitting system is useful in a paging service, for example, so that doctors or others can be reached quickly even though their exact whereabouts is unknown. In a system of this type, a coded signal, for example a three digit number, is assigned to each subscriber who carries with him a small pocket radio which he can turn on at intervals to listen through the cycle of code signals being broadcast from a central office. If the subscriber hears his code signal, he knows he is being paged and that he can receive the message by telephoning the central office. When he calls for the message, his code number is removed from the cycle of signals being transmitted.

Such a transmitter must be capable of continuous and reliable operation over long periods of time, and must be arranged to repeat the cycle of code signals continually and automatically. The transmitter must be arranged so that the operator can quickly change the code signals being broadcast without interrupting the operation of the transmitter for more than a short period of time.

In order for the listener to be able to identify his own call signal readily, it is important to provide suitable spacing between the numbers or code groups being broadcast, so that each of the code numbers is separated by regular time intervals. It is the object of the present invention to provide a transmitting system that meets these requirements and which is both simple and commercially practicable.

These and other aspects, objects, and advantages of the present invention will be in part pointed out in and in part apparent from the following description of one embodiment of the invention, considered in conjunction with the accompanying drawings, in which:

Figure 1 represents, diagrammatically, a transmitting system embodying the invention;

Figure 2 is an enlarged diagrammatic cross-sectional view taken along line 2—2 of Figure 1; and

Figure 3 is an enlarged perspective view of a record carrier with its record carrying a single code group together with a portion of the supporting structure.

In the transmitting system illustrated in the drawings, an individual sound record is prepared for each subscriber who is identified, for example, by a three-digit code number. Such a record

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with its carrier is indicated generally at 2 in Figure 3. The record is formed by sound signals recorded optically on photographic film, as indicated at 4, which is secured to the surface of, or encased in, a strip 6 of clear solid material, such as glass or plastic. The opacity of the photographic film 4 varies along its length in accordance with the voice signals so that when the cord 2 is moved longitudinally so as to intercept a beam of light between a light source 8, see Figure 1, and a photocell 10, the current through the photocell 10 varies in accordance with the voice signals recorded on the film 4.

As best shown in Figure 3, each of the strips 6 is provided with a transverse slot 12 near one end, this slot being sufficiently long that the record 2 can be placed on a hook-supporting member 14, which extends horizontally outwardly from a link 16 that is in turn pivotally supported by a horizontal rod 18. This rod 18 is supported by a double-link chain, generally indicated at 20, in Figures 1 and 3.

This endless chain 20 passes successively over a series of sprockets 22, and is driven in the direction indicated by the arrows 40 by means of a drive sprocket 42 which is connected through a speed-reducing gear assembly, indicated diagrammatically at 44, to an electric motor 46.

The record-supporting arms 14 are carried by the chain 20 at regularly spaced intervals throughout the length of the chain 20, the spacing being sufficient to permit easy identification of each separate code group as they are broadcast in succession.

As the chain 20 moves along the lower portion of its endless path, the records 2 hang vertically from the supporting arms 14, but after passing the sprocket 22', the records are dragged horizontally across the surface of a table 48 so as to pass between the light source 8 and the photocell 10.

The supporting structure for the record carriers as they are moved across the surface of the table 48 is shown best in Figure 2. During this portion of the movement of the chain 20, the central portions of the links of the chain are supported by upper parallel surfaces of a double track, generally indicated at 50, carried by the table 48. In order to support and guide the record carriers 2, each record carrier includes a metal strip 52 (see also Figure 3) which extends longitudinally along the plastic strip 6 to which it is secured, for example by rivets 54. This metal strip 52 is narrower than the plastic strip 6 so that the edge of this strip 6, which supports the

film 4 that carries the recorded sound signals, extends beyond the edge of the metal strip 54. When the record carrier is moved across the table 48, the metal strip 52 is on the under side of the plastic strip 6 and moves along a channel formed by two longitudinal members 56 and 58 of L-shaped cross section. Thus, the metal strip 52 guides the record carrier along this track so that its movement is confined to a linear path with no substantial amount of side movement, the record carrier 2 being supported by the metal strip 52 so that the plastic record support 6 does not make frictional contact with the track members 56 or 58, thus avoiding any wear or abrasion of the surfaces of the film 4 or plastic strip 6 which would interfere with the operation of the optical reproducing system. The strip 58 is provided with a vertical opening which is aligned with a lens system, generally indicated at 60, so that light from the source 8 passes through the lens system 60, through the vertical opening 61 in the track member 58, and is focused on the sound film strip 4, the rays of light emerging through the transparent strip 6 and impinging on the photocell 10.

Thus, as the record carrier 2 moves across the surface of the table 48, the sound track 4 intercepts the light beam producing variations in the current through the photocell 10 which are amplified by an amplifier, indicated in block form at 62 in Figure 1, and fed into a radio transmitter, indicated in block form at 64, where they are used to modulate the radio signal. The amplifier 62 and transmitter 64 may be of any conventional type, using either amplitude or frequency modulation. The transmitter 64 is connected to a conventional antenna arrangement 66, by which the signal is broadcast so that it can be picked up by the receivers in the possession of the individual subscribers.

In this particular example, an optical recording system has been utilized for the purposes of illustrating the principles of operation of the invention, but it is clear that other known recording systems can be utilized.

When a subscriber is called, the operator momentarily stops the endless chain 20 and places a record carrying that particular subscriber's code group on one of the supporting arms 14. Thus, the transmitter automatically broadcasts in continually-repeating cycles the selected code signals of the records which have been placed on the chain. The convolutions of the chain 20 over the sprockets 22 provides sufficient length of chain to accommodate the maximum number of code groups which it may be desired to broadcast in any one cycle. When a subscriber answers his call, the operator momentarily stops the endless chain 20 and removes that particular subscriber's record carrier from the chain.

From the foregoing, it will be apparent that the embodiment of the invention described herein is well adapted to attain the ends and objects hereinbefore set forth, and that it may be readily modified in accordance with the principles set forth herein so as to best suit the requirements of each particular use.

I claim:

1. In an automatic paging system wherein parties to be paged are designated respectively by distinctive audio code signals, apparatus comprising a plurality of separate sound records each having recorded thereon a distinctive code group, a conveyor for removably supporting said records in successive positions along an endless path, a sound reproducing device cooperating with said records, motor-driven means drivably connected to said conveyor to move said records successively into operative position with respect to said reproducing device in continually repeating cycles and in the order in which said record carriers are positioned on said conveyor, and a table for supporting said records arranged to provide vertical and horizontal guidance of said records as they are moved sequentially through said operative position.

2. In an automatic paging system wherein parties to be paged are designated respectively by distinctive audio code signals, apparatus comprising a plurality of separate sound records each having recorded thereon a distinctive audio code group and having a record-supporting guide strip, a chain-link conveyor for removably supporting said records in successive positions along an endless path, a sound reproducing device cooperating with said records, motor-driven means drivably connected to said conveyor to move said records successively into operative position with respect to said reproducing device in continually repeating cycles and in the order in which said record carriers are positioned on said conveyor, and a table for supporting said records and having a linear track arranged to receive said guide strips and to provide vertical and horizontal guidance of said records as they are moved sequentially through said operative position.

3. In an automatic paging system wherein parties to be paged are designated respectively by distinctive audio code signals, apparatus comprising a plurality of separate sound records each including a sound film record of a distinctive code group, a transparent plastic strip supporting said sound film, and a metal guide strip secured to said plastic strip and extending parallel with said sound film, an endless chain conveyor having spaced outwardly-extending arms for removably and swingably supporting said records in successive positions along an endless path, optical sound-reproducing means, motor-driven means for moving said conveyor, said conveyor being arranged to position each of said records successively into operative position with respect to said reproducing means in continually repeating cycles and in the order in which said record carriers are positioned on said conveyor, and a track arranged to receive said metal guide strips of said records to provide vertical support and horizontal guidance of said records as they are moved sequentially therealong by said conveyor through said operative position.

4. In an automatic paging system wherein parties to be paged are designated respectively by distinctive audio signals, apparatus comprising a plurality of separate sound records having predetermined audio signal groups recorded thereon, conveyor means moving along an endless path for supporting said records, automatic repeater means including a sound reproducer cooperating with said records for reproducing said signals and means for producing relative scanning movement between said conveyor means and said sound reproducer arranged to produce selectively and repeatedly in continual cycles selected portions of said signal groups, and means for removably securing said records to said conveyor means.

5. For use in an automatic paging system wherein a changeable series of code groups are reproduced by a reproducing and transmitting system in continually repeating cycles; a record for carrying a distinctive code group comprising

a transparent record carrier, a linear record element having variable light transmission properties along its length in accordance with predetermined audio code signals, means securing said record element to said transparent carrier, and a record guide strip secured to said record carrier and extending parallel to said record element for supporting said record during reproduction, said record being adapted to ride in a complementarily dimensioned guideway.

6. For use in an automatic announcement system, a sound record comprising a transparent plastic strip, a sound film secured to said transparent strip and extending parallel with and adjacent one edge thereof, and a metal runner extending lengthwise of and secured to said strip for supporting and guiding said record during reproduction, said runner being adapted to ride in a complementarily dimensioned guideway.

7. In a sound reproducing system including a sound reproducing head; apparatus comprising, a conveyor, a plurality of individual elements mounted on said conveyor, said elements each having a distinctive group of audio sounds recorded thereon, means for moving said conveyor and said reproducing head relative to each other, and means for guiding said elements into operative sound reproducing relationship with said head.

8. In a paging system including a sound reproducer, apparatus comprising, a movable support, a plurality of individual elements, said elements each having a distinctive group of audio sounds recorded thereon, means on said support and on said elements for readily removably mounting said elements on said support in a plurality of various positions, means for moving said sound reproducer and said support relative

to each other, and means for coordinating movement of said elements with respect to said sound reproducer so that said sound reproducer can reproduce the recordings on said individual elements.

9. In a paging system including a sound reproducer; a record for said sound reproducer comprising, a support having a plurality of positions for locating elements thereon, a plurality of individual elements readily removably attached to said support at at least a portion of the positions, said elements each having a distinctive group of sounds recorded thereon; means for causing relative movement in repeating cycles of said record and said sound reproducer; and means for coordinating movement of said elements with respect to said sound reproducer so that said sound reproducer can reproduce the recordings on said individual elements.

10. For use in an automatic paging system, a record to be played in continually repeating cycles comprising a support, a plurality of individual elements having distinct sounds recorded thereon, and means for readily removably mounting said elements in successive positions to said support, said elements having guide means for tracking said elements through a sound reproducer.

WALTER ROBERT HICKS.

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