July 9, 1946. K. L. COULTER 2,403,503

DETECTING SYSTEM AND APPARATUS

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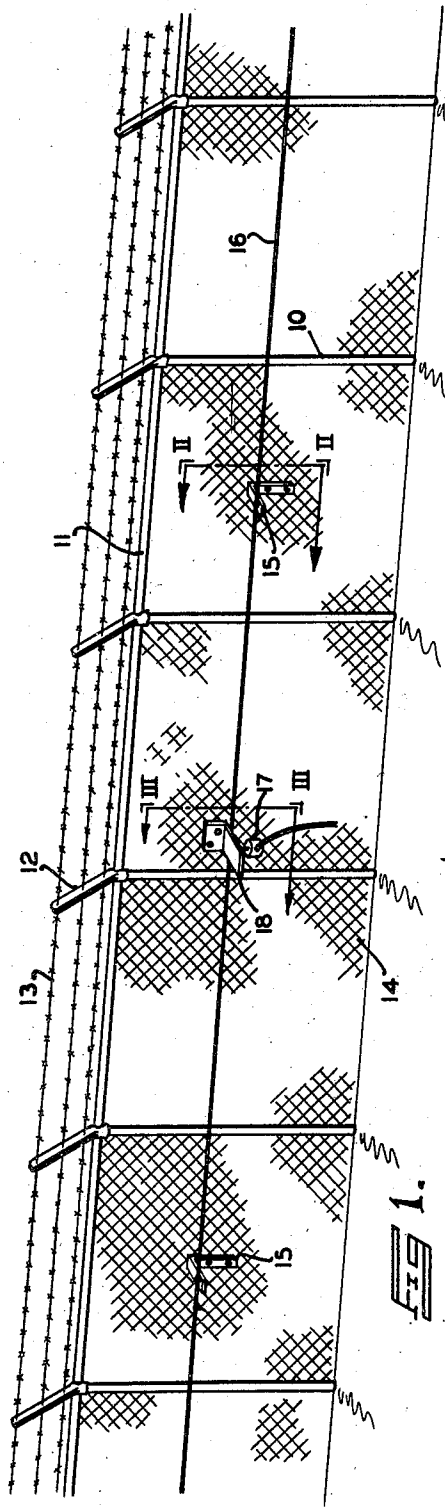


Fig 1.

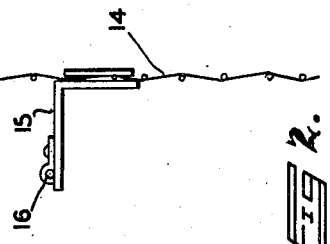


Fig 2.

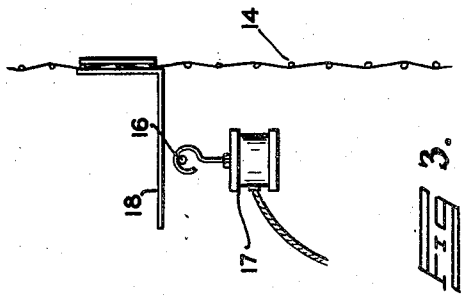


Fig 3.

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DETECTING SYSTEM AND APPARATUS

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1 Claim. (Cl. 177—314)

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This invention relates to a detecting system and apparatus of the kind utilized in connection with alarm systems for warning of movements on or about protective barriers or enclosures such as, for example, wire fences and similar enclosures extending about an industrial factory. The present invention is concerned primarily with the arrangement or method of mechanically coupling the sensitive pick-up device or devices to the barrier or enclosure.

When the detecting devices are applied directly on the wire strands or fabric of the fence or enclosure it is found that the vibration transmitting qualities of the average industrial fence varies between wide limits and in many instances is possessed of such high transmission loss that in order for the pick-ups to be effective on distant signals a high amplification factor must be utilized. Amplification of this nature is difficult to control or to achieve with fidelity and, moreover, increases the sensitivity of the individual pick-ups beyond desirable limits to signals at short distances and yet is inadequate to properly amplify more distant signals of equal magnitude, due to the aforesaid transmission loss. The present invention seeks to obviate this objectionable aspect of the prior system and the primary object of the invention is the provision of an improved arrangement for mechanically coupling the sensitive pick-up devices to the barrier or enclosure whereby a substantially uniform degree of effective sensitivity will be maintained throughout the whole of the length of the barrier or enclosure.

The above object is accomplished, in accordance with the preferred embodiment of the invention by applying an efficient vibration transmitting band to the enclosure or barrier and attaching the pick-up devices directly to this band. In the preferred embodiment of the invention, this band may consist of a length of taut piano wire rigidly connected to the barrier or enclosure at spaced intervals. Thus substantially improved results in the detecting of unauthorized movements on or about the protective barrier or enclosure may be attained regardless of the structural character of the barrier or enclosure.

Another object of the invention therefore is the provision of an improved arrangement for attaching the sensitive pick-up device or devices to the barriers or enclosures whereby the usefulness of the involved system is substantially increased.

The above and other objects and advantages of the invention will become apparent upon the

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consideration of the following detailed specification and the accompanying drawing wherein there is specifically disclosed a preferred embodiment of the invention.

In the drawing:

Figure 1 is a perspective view of a section of a fence of the type usually employed about industrial establishments, a view showing a preferred mode of applying the present invention to such fence;

Figure 2 is a sectional view along the line II—II of Figure 1; and

Figure 3 is a sectional view along the line III—III of Figure 1.

In the illustrated embodiment of the invention, the fence may consist of a series of vertically extending posts 10 connected together at their upper ends by the horizontal rail 11. Stretched over the frame provided by the posts 10 and rail 11 is the wire mesh 14 and it will be understood that, in accordance with usual practice, the wire 14 is secured to the posts and rail at suitable intervals. A fence structure of this character may also include inclined top masts 12 to which are fastened strands 13 of barbed wire.

Reference numeral 17 designates a sensitive mechanical vibration-electrical transducer of the kind disclosed in detail in the aforesaid co-pending application and is operative to detect minute vibrations set up in any object to which it may be attached. It is found that if the transducer or "pick-up" is attached to or suspended directly from the fence its range of sensitivity is rather limited, depending on the vibration transmitting characteristics of the fence structure and the practical objection to the increasing of the amplification factor beyond a certain value, it being understood, of course, that the detections of the unit 17 are suitably amplified before being reproduced audibly.

The present invention provides a practical arrangement for distributing the effective sensitivity of the pick-up 17 substantially uniformly along the fence or enclosure. For this purpose the fence or enclosure is banded with a length 16 of wire having good mechanical vibration transmitting characteristics as, for example, piano wire. Wire 16 is rigidly secured to the fence structure at spaced intervals and preferably the attachment is made to the fabric 14 by the brackets 15 at points disposed centrally in bays formed by adjacent posts 10. It should be understood however that the points of attachment may be varied as to location and interval and may be

made on any of the other parts of the fence structure.

The pick-ups 17 are suspended from the wire 16 at suitably spaced intervals, each unit being protected by a roof or cover 18 carried by the fence structure directly. In representative commercial embodiments of the invention the pick-ups 17 are spaced from 150 to 300 feet along the wire 16. In operation, minute and localized vibrations set up in the fence or enclosure at any point are transmitted along a comparatively short path to one or the other of the brackets 15 and thus to the wire 16. The wire 16 is maintained under tension and this together with its physical character provides a highly efficient channel for the transmission of mechanical vibrations from any of the brackets 15 to one or more of the pick-ups 17. In this manner the effective sensitivity of the pick-ups is more uniformly distributed throughout the length of the fence or enclosure.

Other advantages of the use of the invention are that a substantial reduction may be made in the number of pick-up units and that a more economical amplifier may be employed. The amplification gain may be materially lowered since the detection of vibrations set up at points spaced materially from the respective pick-ups is much more efficient.

The above specifically described embodiment of the invention should be considered as illustrative only as obviously many changes may be made therein without departing from the spirit or scope of the invention. Reference should therefore be had to the appended claim in determining the scope of the invention.

What I claim is:

Apparatus of the character described comprising in combination a plurality of fence posts, a woven wire fence secured to said posts, laterally extending brackets secured to said woven wire at spaced intervals positioned intermediate said posts, a taut wire rigidly connected to the outer ends of said brackets, and a mechanical vibration-electrical transducer having its mechanical driving element mechanically connected to said taut wire.

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