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J. B. WALKER
CARRIER FOR CODE MESSAGES
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2,084,052

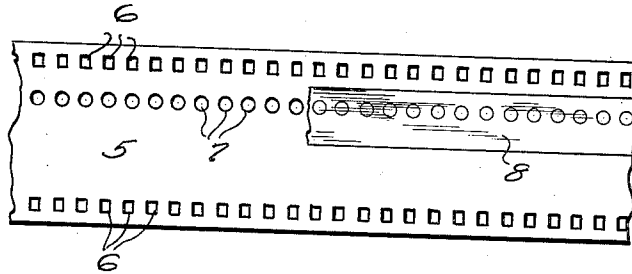


Fig. 1.

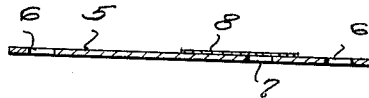


Fig. 2.

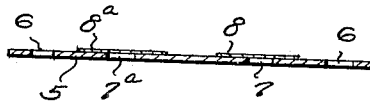


Fig. 3.

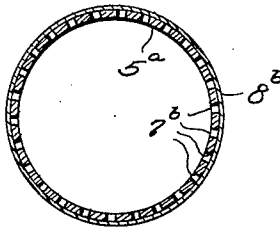


Fig. 4.

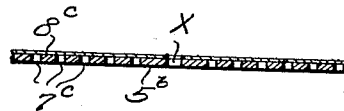


Fig. 5.

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UNITED STATES PATENT OFFICE

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CARRIER FOR CODE MESSAGES

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Application September 23, 1933, Serial No. 691,406

3 Claims. (Cl. 178—112)

This invention relates to carriers for code messages. In my copending application Serial No. 611,449, filed May 16, 1932, there is disclosed a method of transmitting secret messages wherein a message is first produced in intelligible form upon a first message carrier, and said message is then reproduced in garbled or scrambled form upon a second message carrier. Ultimately, this message is restored to its original and intelligible form by a reversal of the garbling or scrambling process.

In the application aforesaid, I have referred to the use of perforated tapes as one form of carrier that I contemplate employing. Up to the time of my invention no code had ever been devised which could not be "broken" or de-coded by those skilled in matters of that sort. One of the reasons that the method described in my application aforesaid produces a code which can not be de-coded by unauthorized persons, as for example, in military operations, enemy experts; lies in the fact that in the garbling of the message I not only mix complete characters, but I go further and fractionally divide the characters themselves and then mix these fractions. This can very easily be done when using international code wherein the various letters are composed of groups of dots and dashes. However, this relatively fine subdivision of characters and fractions thereof, while contributing so largely to the efficiency and safety of my method, carries with it the necessity for a considerable degree of accuracy in the manipulation of the tapes employed as message carriers, because it is apparent that where we have divided a group of dashes or dots, or dots and dashes, the whole message may be thrown off and rendered unintelligible, when de-coded, if the tape gets out of position by as much as the equivalent of a single dot or fraction thereof. Consequently, it becomes important to provide a carrier which will be absolutely proof against such changes in linear dimensions either by way of extension through expansion, or by way of shortening through contraction, as would throw the message off, and it is in the provision of a carrier which will be safe from these stand-points, that the present invention is primarily concerned.

It is also important to provide a carrier made of a material which will not be unduly expensive, can not be easily torn or broken, will be non-corrosive, will lend itself to repeated use if desired, or may be held as a permanent record over long periods, without deterioration.

It is a further object of the invention to provide

a carrier which, while possessing the advantages above outlined, will lend itself to quick and easy perforation.

A carrier embodying all of the foregoing advantages is illustrated in the accompanying drawing wherein:

Figure 1 is a face view of a fragment of a tape constructed in accordance with the invention.

Figure 2 is a transverse sectional view thereof.

Figure 3 is a transverse sectional view through a modified form of the carrier.

Figure 4 is a transverse sectional view showing the carrier in the form of a cylinder instead of in the form of tapes.

Figure 5 is a sectional view of a carrier in the form of a disc instead of a tape.

Like numerals designate corresponding parts in all the figures of the drawing.

Referring to the drawing, Figures 1 and 2, 5 designates the main body of tape which consists of a ribbon of thin material, such as spring brass, for example, or any other flexible material having a low coefficient of expansion. This strip or ribbon is so thin that it may readily be wound upon reels to be fed past suitable perforating mechanisms. Sprocket openings 6 are formed in the strip for the reception of the teeth of sprocket feed wheels, like those commonly employed in motion picture apparatus and by which the strip may be fed accurately and to just the desired degree in either direction.

In the form of the invention illustrated in Figure 2, I have shown a row of openings 7 which correspond in number and spacing with the adjacent sprocket openings. While I prefer to have these openings 7 correspond in number and spacing with the sprocket openings, it is not essential that they correspond in number as long as their spacing is uniform and bears a definite relation to the feed of the strip. Over this row of openings I cement a strip 8 of a material that is much weaker, and consequently much more readily punched than the material of the strip 5. I do not wish to limit myself with respect to the nature of this material, but I find parchment like paper of the nature of tracing paper, for example, to yield the desired results. This paper has a glazed surface, cuts clean without leaving fibrous edges, is thin, light, cheap, and substantially non-hygroscopic. Further, this material serves as an insulating medium in connection with some machines wherein the message is taken off electrically.

Since the strip 5 is moisture proof, it follows

that the whole assembly may be used in humid climates or under extreme climatic conditions of either heat or cold without any such change in linear dimension from either expansion or contraction as would affect the proper positioning of any of the openings 7.

It will be understood that the openings 7 constitute merely a pre-punching of the material of the carrier and that the code message is formed by perforating the paper strip 8 in such manner as to produce the desired message. The paper strip will not be punched opposite all of the openings 7 but will be punched at some of said openings and not at others in order to form the desired dot and dash characters.

In Figure 3 I have indicated an additional row of openings 7a which will be like and serve the same purposes as the openings 7 and will be covered by a paper or like strip 8a corresponding to paper strip 8. This arrangement will render it possible to cause the carrier 5 to do double duty in that it provides an additional row of openings; the paper over which may be punched in the manner hereinbefore described.

In Figure 4 the main body of the carrier is in the form of a cylinder 5a provided with a series of pre-formed openings 7b and covered with a web 8b of any suitable material, such as paper, wax, synthetic resins, collodion, or any other suitable material that is materially weaker than the body 5a. Any suitable means may be used for imparting movement to the cylinder such, for example, as the usual mandrels used in dictaphone machines.

In the form of the invention illustrated in Figure 5, I have indicated the main body of the carrier as being in the form of a disc 5b having the pre-formed openings 7c therein which openings may be spirally disposed in the disc and are covered by a web 8c corresponding to the webs 8a and 8b hereinafter described.

The disc may also be provided with a central opening X corresponding to the usual central opening of a phonograph disc record by which the disc may be mounted upon a rotative table in the manner common in the rotation of phonograph records.

An important advantage in the use of the relatively strong body 5, 5a, 5b, etc., as herein described resides in the fact that after the message has been delivered therefrom, the paper webs may be readily washed from said bodies and the latter used over and over again.

While the substantial retention of the original dimensions is an important characteristic of this improved carrier, another feature of importance resides in its freedom from liability to accidental injury through tearing; a possibility which would always be present if mere paper tapes were relied upon.

A further advantage inherent in the described arrangements lies in the fact that since the paper webs 8, 8a, 8b, 8c are relatively weak and easily punched, as compared with the bodies 5, 5a, 5b, a more rapid punching of the message may be had than would be the case if it were attempted to punch the desired message directly into the bodies 5, 5a, 5b, themselves.

In a perfected and highly desirable form of machine for punching the message, a small punch operates continuously and with relation to every opening in the metal carrier, but its throw is not sufficient to perforate the paper except at the desired points. When these points are reached, the throw of the punch is automatically increased the

necessary amount. The utility of this arrangement resides in the fact that the punch does not have to completely stop and start for every opening but already has the desired momentum and some throw, and it is only necessary to increase this throw slightly in order to punch the paper. This desirable action is facilitated by the use of a material as easily punched as is the paper strip 8 and yet the complete assembly has all the strength and freedom from tearing and undue changes in linear dimension; imparted thereto by the presence of the bodies 5, 5a, 5b.

While I have referred to the use of spring brass, it is to be understood that I contemplate the use of any suitable material or composition that is non-expansible or non-contractile to an extent such that it would be likely to change the delivered message. The particular way of transmitting the garbled message to a distant station is not of the essence of this invention. The perforated body constituting the message carrier for the garbled message could be delivered physically to a distant station and there de-coded, or it could be used as a guide to send garbled messages telegraphically. The machines with which this carrier is adapted for use are not part of the present invention; the present application being intended to cover this carrier broadly irrespective of the way in which it may be used.

While the bodies 5, 5a, 5b are non-expansible and non-contractile, it is to be understood that these terms are relative ones. These bodies are so much less subject to changes in dimensions than the paper or other more easily punched webs 8, 8a, 8b, 8c that they serve to prevent changes in dimension within the limits of practicable use of the article, and that, of course, is all that is necessary.

Consequently, it is to be understood that the invention includes within its purview whatever changes fairly come within either the terms or the spirit of the appended claims.

The presence of the relatively strong body 5, 5a, 5b prevents any such getting out of position of a given character perforation as to absolutely insure against misplacing of any of the code characters or fractions thereof. While I have shown sprocket openings along the opposite edges of the strip, it is clear that these openings need not be on the edges of the strip. It would be possible to put a row of sprocket openings at other points on the strip. Further, it is to be understood that the invention contemplates any other means of feeding the strip or other body, in place of the sprocket openings; the essence of the invention residing in the provision of the body 5, 5a, 5b prepunched as described and supporting a more fragile strip which constitutes the material that is actually punched, and this irrespective of the particular means employed for feeding the said body.

Having described my invention, what I claim is:

1. The herein described method of forming a code message which consists of securing a sheet of fragile and easily perforated material upon a backing of a stronger non-expansible and non-contractile material having a series of equally spaced openings formed therethrough and over which openings said sheet of fragile material lies and then punching the sheet of fragile material through selected ones of said openings of the stronger material to thereby form a message pattern.

2. The herein described method of forming a code message which consists in securing a sheet

of fragile and moisture resistant material over a backing of a stronger non-expansible and non-contractile material having a series of equally spaced openings formed therethrough, imparting 5
5 bodily movement to said backing and during such movement punching the sheet of fragile material through selected ones of the openings of the backing to form a message pattern.

3. A code message carrier comprising a body of metal having a series of uniformly spaced openings formed therethrough and a sheet of weaker material cemented thereon over said openings, said sheet of weaker material being punched 5
5 through some of said openings and not others to thereby form a code message pattern.

JOSEPH B. WALKER.