May 15, 1934. B. M. A. TREBES 1,958,598

MACHINE FOR PRESHAPING AND APPLYING TAPES

Original Filed Aug. 21, 1930

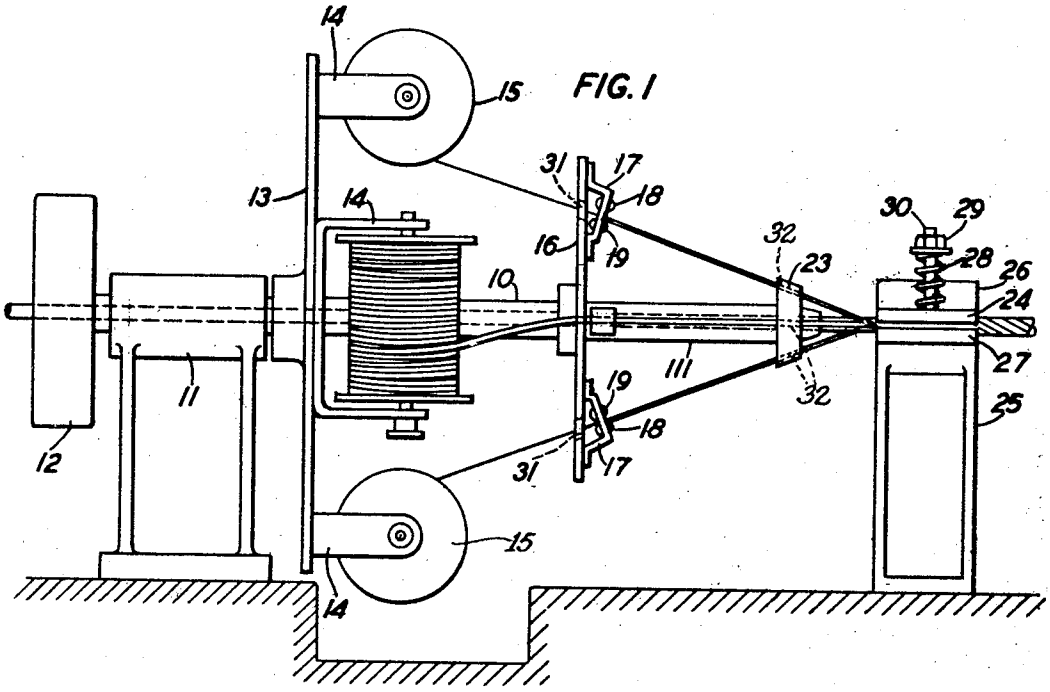


FIG. 1

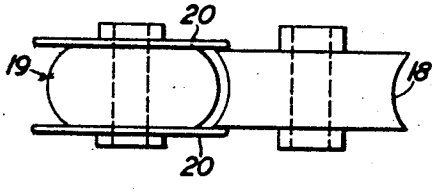


FIG. 2

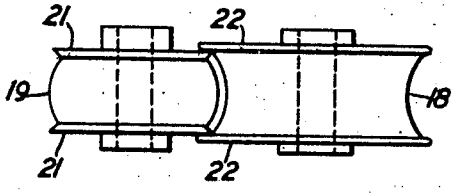


FIG. 3

FIG. 5.

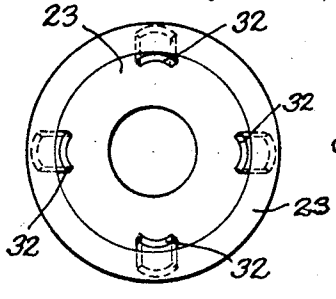
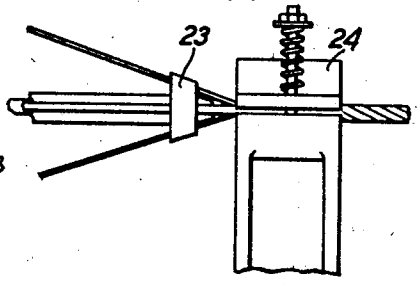


FIG. 4



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Patented May 15, 1934 1,958,598

UNITED STATES PATENT OFFICE

1,958,598

MACHINE FOR PRESHAPING AND APPLYING TAPES

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Original application August 21, 1930, Serial No. 476,771. Divided and this application August 21, 1931, Serial No. 558,449. In Great Britain September 23, 1929

1 Claim. (Cl. 117—20)

In the manufacture of submarine cables in which tape, for example return conductor tape, is laid upon the gutta percha or other insulation, it has been found that the edges of the flat tape do not conform to the insulation. Especially in laying on tape with a very long lay this leads to difficulties, such as injury to the insulation by the edges of the tape in subsequent manufacturing operations.

The present invention relates to a machine whereby the tape is preshaped to fit the insulation with considerable precision. The tape is shaped by running it between a pair of rollers, one of which is concave and the other convex. The concave and convex surfaces abut against each other and the tape passes between them, thus being shaped to conform to the surface of the insulation. These rollers may conveniently be mounted upon the extrusion head and form in themselves a guide for the tape or be used in connection with other guides as may be desired. A machine of this type is useful in applying copper tape forming a return conductor of very long lay to a submarine cable core, but it is of general application in any situation where flat tapes are applied to a cable structure with such long lay that they do not, without shaping, conform sufficiently well to the surface upon which they are laid. For return conductors it is desirable in a particular instance to apply the tapes without overlapping edges, but obviously the invention may be applied to tapes having overlapping edges.

The machine for preshaping and laying the return conductor tapes upon a core comprises a rotatable head, mounted to revolve about the line of motion of the core when the latter is drawn through the machine, one or more storage reels or spools mounted eccentrically upon said rotatable head and adapted to store and deliver the tape, means for swaging or rolling or otherwise preshaping the tape also mounted to be capable of revolving about the line of motion of the core and guiding means whereby the tape is laid upon the core as the core is drawn through the machine and the head is revolved. The guiding means preferably comprises a member, rotatable about the line of motion of the core and having channels conforming to the configuration of the tape and lying substantially in a conical surface. The working elements for preshaping the tape preferably consist of cooperating rollers the surfaces of which are given curvatures about axes perpendicular to the axes of the rollers to conform with the curvature of the surface of the core. Preferably, the head, the means for preshaping the tape, and the guiding means are mounted upon a common tubular shaft through which the core is drawn and which is rotated by a power drive. The core may be drawn through the machine by means of a capstan or winch.

In addition, a polishing or burnishing device may be located between the guiding means and the capstan or winch, so that the surface of the tapes will be rendered smooth after the tapes are laid upon the core.

For the better understanding of the invention one embodiment thereof will be described with reference to the accompanying drawing in which,

Fig. 1 is a diagrammatic side elevation of a machine for preshaping tapes and laying them upon a core;

Fig. 2 is a diagrammatic view of a pair of rollers which may be utilized for preshaping the tape;

Fig. 3 is a similar view of a modified form of the rollers which is particularly suitable for preshaping heavy tapes with right angled corners;

Fig. 4 is a side elevation of part of the structure shown in Fig. 1 illustrating a modification which may be utilized where accurate spacing of the tapes upon the core is required; and

Fig. 5 is a front view of the guiding meaps shown in Fig. 1.

Referring now to Fig. 1, a horizontally disposed tubular shaft 10 is mounted in a journal bearing 11 and is provided with a driving pulley 12. A circular head 13 is mounted upon the tubular shaft 10 and carries a plurality of brackets 14. The number of brackets 14 is equal to the number of tapes which are to be laid upon the core. The brackets 14 carry spools 15 for storing the tapes.

A face plate or head 16 is mounted upon the end of the shaft 10 and carries a plurality of brackets 17. In the brackets 17 are supported rollers 18 and 19.

The rollers 18 and 19 may be of the form illustrated in Fig. 2, the curvature of the roller 19 being equal or approximately equal to the curvature of the surface of the core upon which the tapes are to be laid. The curvature of the concave roller 18 corresponds to that of the roller 19, taking into consideration the thickness of the tape. The roller 19 is provided with flanges 20 which embrace the edges of the roller 18. Alternatively, especially where tapes of heavy section with right angled corners are to be applied to the core, rollers illustrated in Fig. 3 may be utilized. The roller 19 is

provided with bevelled flanges 21 which are embrace by flanges 22 upon the roller 18.

Reverting to Fig. 1 the shaft 10 is provided with an extension 111 which may be in the form of a split tube. On the extension 111 is mounted a guiding means 23. As can more plainly be seen in Fig. 5, guiding means 23 consists of a conical die-like member having a plurality of channels 32—32 in its periphery which correspond in section to the section of the tape after it leaves the rollers 18 and 19. Adjacent to the end of the shaft extension 111 and guiding means 23 a polishing or burnishing device 24 is mounted upon a pillar 25. If the spacing of the tapes upon the core is required to be very accurate, then the polishing device 24 should be located close to the guiding means 23 as shown in Fig. 4. The polishing or burnishing means 24 consists of two members 26 and 27, each having a semi-circular groove therein and pressed together by springs 28 and nuts 29 screwed upon bolts 30.

In the operation of the machine supplies of tape are wound upon the spools 15. The ends of the tapes are passed through guide holes 31 in the face plate 16 and thereafter between the rollers 18 and 19. The tapes are then passed through the channels 32—32 in the guiding means 23 and attached to the core which is passed through the tubular shaft 10 and extension 111 and through the polishing or burnishing device 24 to a capstan or winch. The core is drawn through the machine by the capstan or winch at a predetermined rate. The head 13, face plate 16 and guiding means 23 are revolved at a predetermined rate in accordance with the desired lay of the tapes upon the core by applying a drive to the pulley 12. The core is not rotated.

It will be seen that as the core is drawn through the machine and tapes are drawn continuously between the rollers 18 and 19 and are thereby shaped to conform to the configuration of the core and are thereupon laid upon the core with a predetermined pitch. A machine of the type illustrated with suitably proportioned parts may be utilized for preshaping and laying tapes upon electrically conducting cores, as for example in laying the surrounds upon the central conducting core of a submarine cable. It may also be used for laying tapes upon an insulated core, as for example in providing a submarine cable with a return conducting path.

By preshaping the tapes constituting the return conductor of a submarine cable, damage to the insulation of the cable core is avoided, especially in the case of cores of large diameter. Furthermore, the effective A. C. resistance of the return conductor is reduced by causing it to lie as close as possible to the core at every point. The machine as described herein causes the return conductor tapes to conform to the core with the desired degree of closeness and in fact to fit it exactly.

This application is a division of application Serial No. 476,771, filed August 21, 1930.

What is claimed is:

A machine for laying flat tapes with a long lay upon a circular core, said machine having spools for carrying tape, said spools being mounted to revolve about the core, the machine being characterized in this that shaping mechanism comprising a pair of faced rollers, one concave and the other convex, is located between each spool and the core to shape the tape in conformity with the surface of the core, said shaping mechanism also comprising appropriate devices to guide the tape between the adjacent faces of said rollers, and a guide member for uniformly spacing the tapes about the core, said guide member being located between the shaping mechanism and the core.

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