MARKING APPARATUS FOR ELONGATED OBJECTS

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ABSTRACT

Marking apparatus for printing on the surface of elongated objects, comprising a rotatable marking roll adapted to engage the object, a rotatable feeding roll partially immersed in an ink trough and being in engagement with the marking roll to transfer ink thereto, an assembly for causing the feeding roll to rotate at a lower speed than the marking roll, and an automatic ink feed device which supplies ink to the trough.

1 Claim, 4 Drawing Figures
MARKING APPARATUS FOR ELONGATED OBJECTS

BACKGROUND AND SUMMARY OF THE INVENTION

This invention relates to a marking apparatus which continuously prints figures, letters, signs, etc., on the surface of electric wire or other elongated objects along their length.

This invention provides an apparatus which precludes the splashing about of excessive ink and staining of the electric wire or other objects under manufacture when doing the above-mentioned printing and which at the same time produces a uniform print. As will be disclosed, the apparatus comprises a marking roll, a feeding roll which is partly immersed in the ink trough and which revolves at a lower speed than the marking roll and which is so constructed that the marking roll and feeding roll are in contact with each other with a layer of ink therebetween, and an automatic ink feed device which automatically supplies ink to the ink trough.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front sectional view of a prior art marking apparatus heretofore in use;
FIG. 2 is a front sectional view of the marking apparatus of this invention;
FIG. 3 is a side view of the apparatus shown in FIG. 2; and
FIG. 4 is a front sectional view of the marking apparatus of this invention provided with an automatic ink feed device.

DESCRIPTION OF THE PREFERRED EMBODIMENT

This invention relates to a marking apparatus for printing figures, letters, signs, etc., on the surface of electric wire or other elongated objects continuously along their length.

Such an apparatus as shown in FIG. 1 has heretofore been used for printing figures, letters, signs, etc., on the surface of electric wire or other elongated objects. The printing has been accomplished with such an apparatus in the following manner:

On the circumferential surface of a roll which contacts the surface of the wire 1 are made negative or positive engravings of signs or the like. The marking roll 2 which has been prepared in this way is so positioned that its lower part is slightly immersed in the ink trough 3. If the wire 1 is moved in the direction of the arrow, the marking roll 2 revolves in the direction of the arrow because of its friction with the wire 1 and the ink is picked up by the marking roll 2. The excess ink is wiped off by means of a scraper 4 and the necessary print is produced on the surface of the electric wire 1.

However, if the speed of movement of the electric wire becomes high, the speed of revolution of the marking roll also becomes high, and the viscosity of ink causes the ink to attach itself more than necessary on the circumference and lateral faces of the marking roll. Such excessive ink which the scraper has failed to wipe off, especially the ink which has attached itself on the lateral faces of the marking roll, splashes about because of the centrifugal force and stains the wire and other things in the vicinity thereof.

Moreover, it is necessary that a fixed quantity of ink is picked up by the surface of the marking roll at all times, if a uniform marking is to be accomplished on the surface of the wire which is moving at a constant speed in case the marking roll is revolved by the friction of its contact with the electric wire and a part of the marking roll thus moves on immersed in the ink in the trough 3. For this purpose, it is necessary that the height of the surface of the ink in the trough be maintained constant.

However, the height of the surface of the ink in the ink trough comes down due to consumption and evaporation. It would be desirable, therefore, to maintain the viscosity of the ink in the ink trough and the height of the surface of the ink in the ink trough at substantially constant values.

An object of this invention is to provide a marking apparatus which is not subject to the drawbacks of the marking apparatus shown in FIG. 1. Heretofore in use and which is suitable for a high speed marking operation, and further to provide a marking apparatus provided with an ink feed device which can automatically supply ink to the ink trough.

A characteristic of this invention is that the apparatus is provided with a marking roll and a feeding roll which has a portion immersed in the ink trough and which revolves at a lower speed than the marking roll, and that it is so constructed that the marking roll and feeding roll are in contact with each other with a layer of ink therebetween.

Another characteristic of this invention is that the marking apparatus is provided with an ink feed device which comprises an ink trough which supplies ink to the feeding roll and in ink feed tank which is connected to the ink trough, the ink trough having an ink supply opening which opens above and below the surface of the ink, the ink feed tank having a stopper in the upper part and an ink supply regulating cock in the lower part, and the tank being connected to the ink trough via the supply opening of the ink trough and the regulating cock of the ink feed tank.

The present invention will now be explained in detail, with reference to the drawings. In FIG. 2, FIG. 3, and FIG. 4, the same numerals and letters as those used in FIG. 1 indicate the same parts.

In FIGS. 2 - 4, 5 denotes the feeding roll. Its lower part is immersed in the ink trough 3, and its upper part contacts the marking roll 2 with the ink layer 6 therebetween. 7 denotes the scraper for the feeding roll. 8 denotes the gap regulating eccentric wheel for the feeding roll 5 and the marking roll 2. The eccentric wheel 8 has gear teeth 9 which mesh with the worm gear 10 which is rotated by means of the handle 12 attached to its axle 11.

In FIG. 3, 13 and 14 denote respectively the bearings for the revolving axles 15 and 16 of the marking roll 2 and feeding roll 5, respectively. 17 denotes the supporting lever for said bearings 13 and 14. 18 and 19 denote respectively the pulleys fixed at the other ends of said revolving axles 15 and 16, and are connected by means of a belt 20. These pulleys 18 and 19 are for the purpose of making the feeding roll 5 revolve at a lower speed than the marking roll 2, the diameter of the pulley 16 being smaller than that of the pulley 17. Consequently, the rotational speed of the feeding roll 5 is reduced in accordance with the ratio of the pulley diameters. As an alternative, the feeding roll 5 may be re-
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The reduction of the revolving speed of the feeding roll 5 may also be effected by making it of a material having a small friction coefficient, such as Teflon.

Because of the presence of the feeding roll 5, the ink attaches itself only to the circumferential surface of the marking roll 2, and not to the lateral faces. The control of the quantity of ink attaching to the circumferential surface of the marking roll is effected by moving the eccentric wheel 8 of the feeding roll 5 to vary the gap between it and the marking roll 2.

In FIG. 4, 21 denotes the ink supply opening which opens through the surface of the ink in the ink trough 3, 22 denotes the ink feed tank which contains ink 26 of a fixed viscosity and which is connected to the ink trough 3, 23 denotes the stopper for the ink inlet, and 24 the valve cock for the ink level regulation. It is connected to the supply opening 21 of the ink trough 3 by the passage 25.

Ink may be supplied to the ink trough 3 through the passage 25 and the supply opening 21 from the feed tank 22 upon turning the cock 24, while air may be introduced into the feed tank 22 at the same time as ink is supplied. In case the position of the valve cock 24 has been adjusted to a given height of the ink surface, an equilibrium due to the atmospheric pressure is maintained because the ink in the ink trough 3 and the ink in the ink feed tank 22 are connected together, and no ink is fed. However, as a result of the lowering of the ink surface due to the consumption of ink, air flows into the feed tank 22 through the cock 24 and in place of it, the ink 26 of the fixed viscosity in the feed tank 22 is automatically supplied through the passage 25 of the cock 24 and the supply opening 21 and raises the level of the ink surface to thus cut off the introduction of the air.

The above-mentioned automatically controlled feeding is repeated until the ink 26 in the feed tank 22 is exhausted. When the level of the ink 26 in the feed tank 22 has come down to a given quantity, the stopper 23 for the inlet in the upper part is removed and ink is poured in for replenishment.

It is possible to effect delicate control of the quantity of ink supplied to the feeding roll in high speed marking, because, as already mentioned, the height of the surface of the ink cannot only be maintained constant by automatically supplying ink of a fixed viscosity, but can also be adjusted freely by adjusting the opening of the cock.

What is claimed is:

1. A marking apparatus for marking a moving elongated object moving at high linear speeds, said apparatus comprising, in combination:
   a freely rotatable marking roll mounted for rotation about its axis and in peripheral contact with said elongated object for frictional rotation by peripheral engagement therewith,
   an ink trough,
   a rotatable ink feeding roll mounted for rotation about its axis, having a circumferential, peripheral surface and lateral surfaces partially immersed in said ink trough and having its periphery spaced slightly from the periphery of the rotatable marking roll,
   means for variably regulating the gap between the marking roll and the feeding roll by shifting the axis of the rotatable ink feeding roll relative to the axis of the rotatable marking roll, and
   drive means carried by said frictionally driven, rotatable marking roll engaging said rotatable ink feeding roll for driving said ink feeding roll at a substantially slower speed than the rotatable marking roll,

whereby, the relative slow speed of the feeding roll relative to the marking roll and the variable gap between the opposed peripheral surfaces of said roll permit close control of ink transfer from the rotatable marking roll to the high speed moving elongated object.