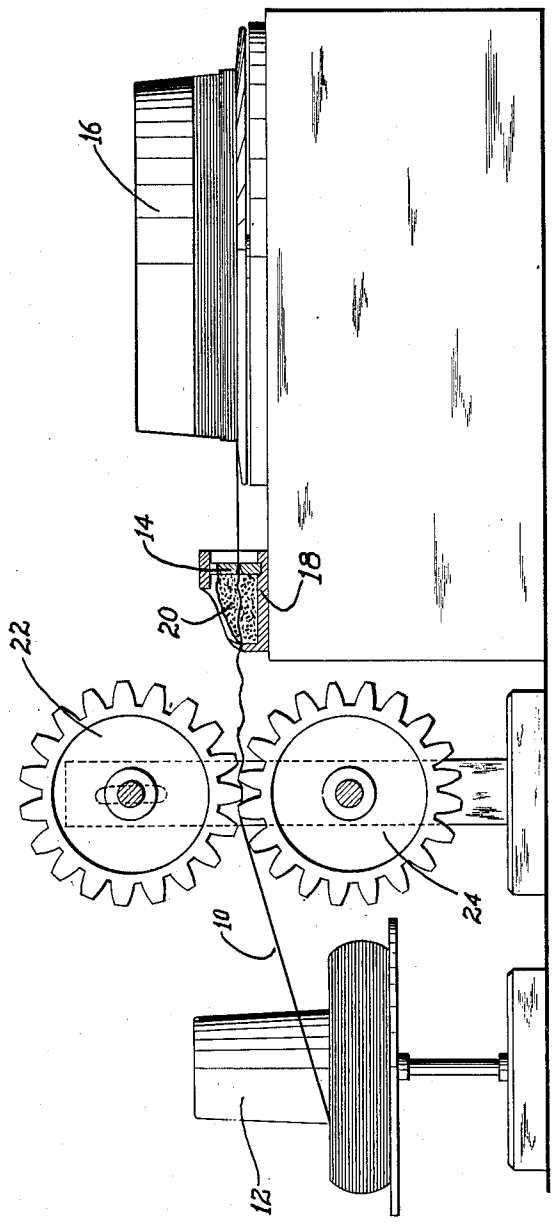
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WIRE DRAWING APPARATUS

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WIRE DRAWING APPARATUS

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This invention relates to the drawing of wire, and is illustrated as embodied in apparatus for the dry drawing of wire through a die.

In the dry drawing of wire and the like, it is of fundamental importance to secure adequate lubrication of the wire (usually by means of fine soap power or the like) as it passes through the die. In case of defective lubrication, either the die is unduly worn, or the surface of the wire is impaired, or both. If the die is worn, the diameter of the drawn wire soon increases beyond a permissible tolerance, and a new die must be provided. If the wire is injured, not only is this in itself objectionable, but particles of steel from the wire may stick in the die and scratch the surface of the wire as it is drawn.

Among the methods employed to insure adequate lubrication are (1) wet drawing, (2) lubrication with powdered material such as soap powder, and (3) providing a coating of softer metal such as copper on the wire to be drawn. The first of these methods, usually carried out with a solution containing material that forms a copper-tin alloy on the surface of the wire; this coating is delicate and since the operation is performed with a solution the speed of drawing is much limited. The third method involves careful cleaning of the wire, and, especially with fine wire, is rather expensive. The present invention aims to improve the second of the above methods to make it as effective as the first and third methods, without their disadvantages.

The method of lubricating with dry material, such as soap powder, is quite effective if a sufficient quantity of the material is drawn into the die with the wire. The wire may be provided with a rough surface which will hold the powdered material, as for example by allowing it to form a film of rust (so-called "sulling"), and it also helps to cool the die.

According to the present invention, means is provided for giving the wire a non-uniform or jerky movement as it passes to the die through the powdered lubricating material, preferably by forming it with transverse bends which are straightened out again as the wire passes through the die, thus agitating the lubricating material and insuring against caking as well as bringing the material into intimate contact with the surface of the wire.

The above and other objects and features of the invention, including various novel and desirable mechanical constructions and arrangements, will be apparent from the following description of the apparatus shown in the accompanying drawing, in which:

The figure is a diagrammatic side elevation of the apparatus, with the die and the associated container of lubricating material shown in section.

In the illustrated apparatus, a wire 10 is drawn from a suitable switch or other source 12, through a die 14 by means such as a power-driven capstan or the like 16. Associated with the die 14, and immediately ahead of it, is a container 18 for a wire-lubricating material such as finely powdered soap 20, through which the wire is drawn directly into the die. It is desirable to use as fine a powder as possible, as large grains roll and are not easily carried into the die.

In order to assure intimate contact between the soap powder and the wire, and to insure against caking of the powder even if it is ground very fine, the above-described means is arranged to act on the wire between the supply source 12 and the container 18. In the particular embodiment illustrated the wire-preparing means takes the form of two toothed wheels or rotary members 22 and 24, shaped like gears and which partially intermesh (i. e. each tooth of each member projects a short distance between two of the teeth of the other, as the members turn).

The members 22 and 24 may be turned by the friction of the wire 10 on their teeth, the wire being led between them from the swift 12 to the lubricant 20, or they may if desired be driven by power. The wire, in passing between the members 22 and 24, is bent transversely to form a series of undulations or bends. As these reach the die 14, through which the wire passes at a uniform speed, they cause the wire to advance with a varying, almost jerky, movement through the lubricant 20. This stirs the lubricant up to prevent caking, and also brings the surface of the wire into very intimate contact with the lubricant.

The above apparatus, in practice, not only improves the drawing of wire previously treated by "sulling", but also of wire previously coated with copper or lead, and of wire made of stainless steel (i. e. steel containing a relatively large amount of chromium) which is not readily treated by any of the processes heretofore in use.

By changing the size of the teeth according to the diameter of the wire, wire from 5 mm. down to as small as 0.2 mm. have been handled by the described apparatus with very good results. It has been possible, moreover, to draw

the wire at substantially higher speeds than usual, especially wire made of stainless steel.

It will be appreciated that other mechanical devices, as for example an oscillating arm engaging the wire, can be used to form the transverse bends or undulations in the wire, and that in general, while one apparatus has been illustrated and described, it is not my intention to limit the scope of the invention to that particular apparatus, or otherwise than by the terms of the appended claims.

I claim:

1. Wire drawing apparatus comprising a source of supply of wire, a die through which wire from said source passes, means on the other side of the die from said source for drawing the wire through the die, a container of lubricant material adjacent the die on the side opposite the drawing means and through which the wire passes to the die, and means between said container and said source for producing transverse bends in the wire which are straightened out again as the wire passes through the die said transverse bends agitating the lubricant material to prevent it from packing.

2. Wire drawing apparatus comprising a source of supply of wire, a die through which wire from said source passes, means on the other side of the die from said source for drawing the wire through the die, a container of powdered lubricant material adjacent the die on the side opposite the drawing means and through which the wire passes to the die, and a mechanically-driven device engaging the wire before it reaches said material and which produces transverse bends in the wire to prevent said material from caking.

3. Wire drawing apparatus comprising a source of supply of wire, a die through which wire from said source passes, means on the other side of the die from said source for drawing the wire through the die, a container of lubricant material adjacent the die on the side opposite the drawing means and through which the wire passes to the die, and a pair of rotatable members having interfitting teeth between which the wire passes from said source to said material and which produce transverse bends in the wire to prevent said material from caking.

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