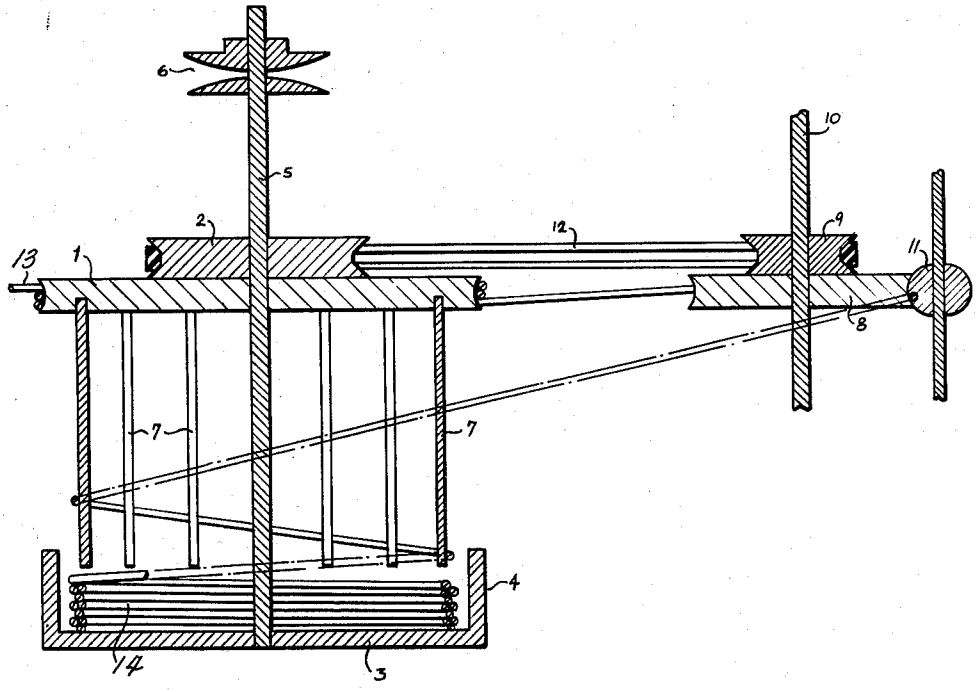
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TAKE-UP MECHANISM

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TAKE-UP MECHANISM

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This invention relates to take-up mechanisms and particularly to apparatus for pulling and coiling elongate flexible material.

Numerous industrial methods have been provided for making and treating flexible elongate material. Such processes include the manufacture of wire, twine, rope, plastic strands and tubing, and the coating or other treatment of such materials. Practically all such processes for making and treating material of this type depend for their success on the emergence of the material from the apparatus at a uniform rate of speed. This is conventionally obtained by pulling the material through the apparatus. Due to the great length of such materials, provisions must be made for collecting them in coils or on spools. Prior to the advent of the present invention, much difficulty was encountered in providing the material with the requisite constant rate of speed and in collecting the finished product. In most instances, these operations were performed by separate mechanisms. The prior art take-up or pulling mechanisms are generally expensive and quite complex and it is usually quite difficult to maintain them in proper adjustment.

It is, therefore, an object of this invention to provide new and novel take-up mechanisms overcoming the disadvantages of the prior art. Another object of this invention is to provide a simplified device of this character. A more specific object of this invention is to provide apparatus for pulling flexible elongate material at a constant rate and then coiling it.

The manner in which these and other objects are accomplished in accordance with the present invention will be apparent from the following specification together with the drawing which is a cross-sectional view of a preferred embodiment of the invention.

In the drawing, capstan 1, pulley 2, and basket reel 3 provided with cylindrical side wall 4, are rigidly mounted on vertical rotatable shaft 5. Power is transmitted to the shaft by a V-belt (not shown) through variable pulley 6. A series of positioning fingers 7 extend downwardly from capstan 1 slightly below the top level of the cylindrical wall 4 of the basket reel 3. A secondary capstan 8 together with a secondary pulley 9 are rigidly attached to a second vertical rotatable shaft 10. As shown in the drawing, an idler roll 11 is in contact with the peripheral concave surface of the secondary capstan 8. The idler roll is preferably spring loaded but the pressure between it and the secondary capstan can be maintained by any suitable means. Drive belt 12, a portion of which has been removed for the sake of clarity, maintains pulleys 2 and 9 in operative relationship.

The operation of this preferred embodiment will be described in connection with the removal of wire from a plastic insulation coating die. The wire 13 emerging from the die is looped twice about the periphery of main capstan 1 and thence to the concave surface of the secondary capstan 8 where it is held firmly in position by pinch roll 11. The wire travels around the secondary capstan and is fed off around positioning fingers 7. The

wire then slides off to form a neat, untangled coil 14 in the basket reel 3.

In accordance with this preferred embodiment, the relationship between the sizes of pulleys 2 and 9 and capstans 1 and 8 is such that the peripheral speed of the secondary capstan is approximately 15% greater than that of the main capstan. This differential in speed, together with the pinch roll on the secondary capstan insures uniform pulling of the wire from the coating apparatus. Although the secondary capstan must in all instances have a greater peripheral speed than that of the main capstan, it will be readily appreciated that this differential can vary greatly and is dependent upon a number of factors, including the nature of the material being processed.

In the interest of clarity and simplification, the embodiment as illustrated in the drawing has a basket reel rigidly attached to the main shaft. It will be readily apparent to those skilled in the art, however, that this receiver need not be attached to the shaft but can be rotated by independent means. Thus, a number of receivers can be sequentially placed in position to facilitate continuous operation with no interruption as the coiled product is removed from the receptacles.

The apparatus of the present invention operates in a simple, dependable fashion and is readily adjustable. For example, the main shaft can be driven at any desired speed and the differential in peripheral speeds of the capstans can be regulated as desired. Also, the amount of friction between the elongate material and the capstans can be controlled by the type of peripheral surfaces on the capstans, the number of turns of the material about the capstans, and by the pressure applied to the secondary capstan by the pinch roll.

While the invention has been described in considerable detail with reference to one embodiment, various modifications will suggest themselves to those skilled in the art. Thus, the locations of the capstans and receiver may be arranged in any convenient fashion and the receiver need not rotate concentrically with the main capstan. The positioning fingers illustrated in the drawing are not an essential feature of the invention but are of value when handling some types of material. In addition, it will be readily apparent that the capstans can be separately driven or operationally inter-connected by any suitable means.

What is claimed is:

1. Apparatus for pulling and coiling elongate flexible material comprising a rotatable main shaft, means for rotating the shaft, a capstan, pulley, and material receiver mounted on the shaft, a second shaft having a capstan and a pulley mounted thereon, a separately mounted pinch roll in association with the capstan on the second shaft, and means for driving the capstan on the second shaft at a higher peripheral speed than the capstan on the main shaft.

2. Apparatus for pulling and coiling elongate flexible material comprising a rotatable main shaft, means for rotating the shaft, a main capstan and material receiver mounted on the shaft, a second shaft having a secondary capstan mounted thereon, a separately mounted idler wheel in association with the secondary capstan and an interconnecting variable drive between the two shafts imparting a higher peripheral speed to the secondary capstan than to the main capstan.

3. The apparatus of claim 1 in which the pulleys and capstans are centrally and fixedly mounted on the shafts.

4. Apparatus for pulling and coiling elongate flexible material comprising a vertical rotatable main shaft, means for rotating the shaft, a capstan fixedly mounted on the shaft, a basket reel mounted on the shaft below the capstan, a pulley on the shaft above the capstan,

a second vertical shaft having a secondary capstan fixedly mounted thereon in subtantially the same horizontal plane as the main capstan, a pulley fixedly mounted on the second shaft above the secondary capstan, an idler wheel in association with the secondary capstan, and a positive drive interconnecting the two pulleys and having means for imparting a higher peripheral speed to the secondary capstan than to the main capstan.

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