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[54] **ARRANGEMENT IN STORAGE TYPE WIRE DRAWING MACHINES FOR CONTINUOUSLY CONTROLLING THE SPEED OF AN INDIVIDUALLY DRIVEN DRAWING BLOCK HAVING AN ASSOCIATED GUIDE BLOCK ARRANGED COAXIALLY THEREWITH AND A GUIDE PULLEY ARRANGED BETWEEN THE BLOCKS**

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[58] **Field of Search** 72/288, 289, 425, 72/443, 279, 21

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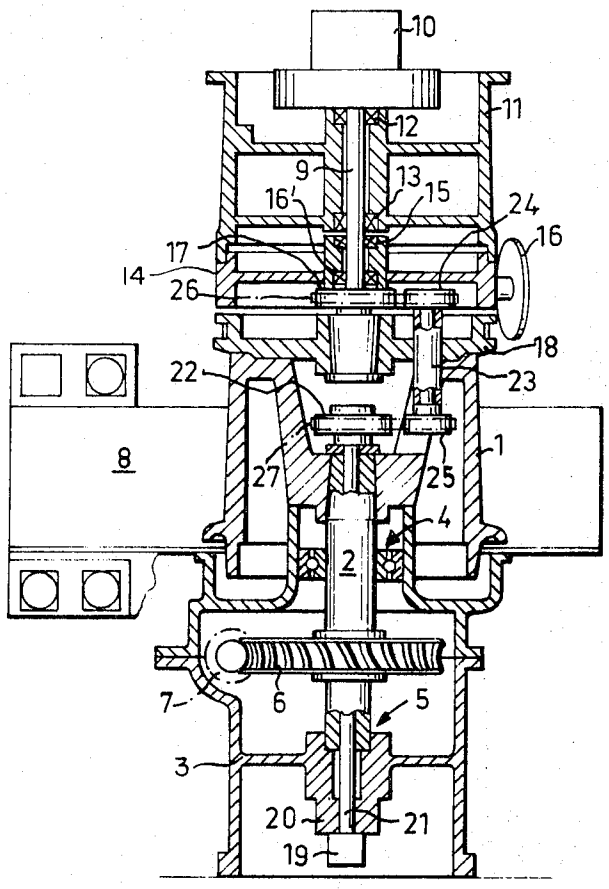
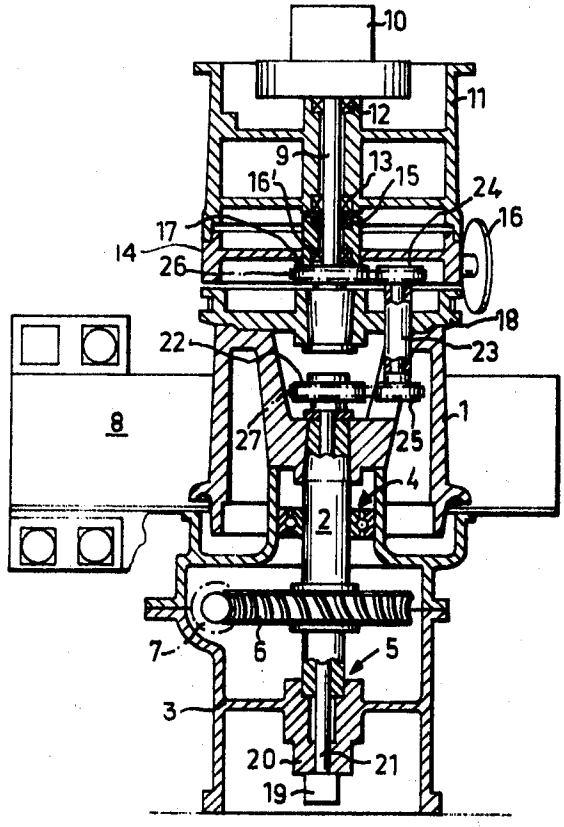
[57] **ABSTRACT**

There is provided an arrangement in storage type wire drawing machines for continuously and automatically controlling the speed of an individually driven drawing block having an associated guide block arranged coaxially therewith and a guide pulley arranged between the blocks, which guide pulley is mounted for rotation on a support means journalled between the blocks and being capable of pivoting relative to the blocks. The pivoting movements of the support means are used to control the speed of rotation of the driven drawing block. The arrangement also includes a machine element which is securely mounted between the blocks on a depending journal pin or shaft over the drawing block and supports transmission means adapted to transmit the pivoting movements of the support means to a device which transmits a signal in response to said pivoting movements to the motor driving the block, thereby to change the speed at which the block rotates.

3 Claims, 1 Drawing Figure





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ARRANGEMENT IN STORAGE TYPE WIRE DRAWING MACHINES FOR CONTINUOUSLY CONTROLLING THE SPEED OF AN INDIVIDUALLY DRIVEN DRAWING BLOCK HAVING AN ASSOCIATED GUIDE BLOCK ARRANGED COAXIALLY THEREWITH AND A GUIDE PULLEY ARRANGED BETWEEN THE BLOCKS

The present invention relates to an arrangement in storage type wire drawing machines for continuously controlling the speed of an individually driven drawing block having an associated guide block arranged coaxially therewith and a guide pulley arranged between the blocks, which guide pulley is mounted for rotation on a support means journalled between the blocks, the support means, in turn, being capable of pivoting in relation to the blocks and the pivoting movements of which are used to control the speed of the driven drawing block.

It is essential in the case of storage type wire drawing machines in which guide blocks are arranged coaxially with the drawing blocks that the wire coiled on the guide block is guided to and from the block correctly, that the wire runs smoothly, and that cooling of the wire can be controlled. This has not been possible with guide means known to the art, with which only so-called limit position control has been possible.

In addition to being incapable of uniformly cooling the wire, the known guide means also render it impossible to utilize programme control systems to control the guide block in relation to the drawing block in a manner to obtain a suitable height of wire on the block.

The object of the present invention is to eliminate these disadvantages and to provide an arrangement which is capable of continuously guiding the wire onto and off the guide block in a manner such that in addition to the wire being coiled smoothly to a suitable height on the block and cooled in a controlled manner, it also enables the various operations to be controlled by the programme systems. The significance of this will be readily perceived, since among other things the purpose of the guide block is to deliver or store wire for a limited period of time in the event of a break-down in the wire drawing machine or the associated coiling mechanism, so that the process may continue without interruption for as long as possible.

The arrangement of the present invention in addition to fulfilling the aforementioned requirements also favourably affects the production output rate, since it renders stopping and starting of separate blocks for controlling the height of the wire stored on the blocks unnecessary, and is mainly characterized in that it includes a machine element which is securely mounted between the blocks on a shaft journal arranged to hang downwardly from above the drawing block and to support a transmission means adapted to transmit the pivoting movements of the support means to a device which transmits a signal corresponding to the pivoting angle in order to provide for a corresponding, compensatory change in the speed of the driven drawing block.

The invention will now be described in detail with reference to an embodiment thereof illustrated in the accompanying drawing, further features of the invention being disclosed in connection therewith. The drawing, in which all machine elements not relevant to the present invention have been omitted for the sake of clarity, is a vertical sectional view of an individually driven drawing block assembly, including a storage drawing block with associated guide block, and being provided with an embodiment of the arrangement according to the invention.

With reference to the single drawing, a rotatable drawing block **1** is mounted on a vertical shaft **2.** The shaft is journalled to a lower frame structure **3,** for example at **4** and **5.** The drawing block is driven by a worm gear **6** mounted on the shaft **2** and the worm gear **6** is arranged to mesh with a worm screw **7** journalled in the lower frame structure and driven by a D.C. motor (not shown), which serves to drive the unit individually.

The lower frame structure **3** also supports a panel **8,** on which are arranged the instruments and control devices required for operating the unit and the arrangement according to the invention.

Stationarily mounted in an upper frame structure **10** is a downwardly extending journal pin **9,** the pin **9** extending coaxially with the drawing block **1** and being positioned above the lower frame structure **3.** Mounted for rotation on the upper portion of the stationary journal pin or shaft, for example at **12** and **13,** is a drum-like guide block **11.** Located immediately beneath the guide block **11** but free therefrom is a drum-like member **14** which is journalled for rotation on the depending stationary journal pin or shaft, for example at **15** and **16'**. The member **14** which hereinafter is called the support means, carries on an external surface thereof a guide pulley **16** which receives the wire running from the drawing block **1** to the guide block **11.** Securely attached to the support means **14** internally thereof is a transmission means **17** which is mounted concentrically around the depending journal pin or shaft **9** and which in the exemplary embodiment is in the form of a belt pulley. Of course, instead of a belt pulley the transmission means may be in the form of a V-belt pulley, a gear or the like. Securely attached to the free end of the depending, stationary journal pin or shaft **9** and located beneath the support means **14** but spaced therefrom is a drum-like element **18.** The element **18** is located immediately above the drawing block **1** and is coaxial therewith but spaced therefrom.

As will be evident from the aforegoing, the guide pulley **16** is arranged between the drawing block **1** and the guide block **11** and is supported by the support means **14,** on which it is journalled for rotation. The support means **14** is capable of pivoting relative to the two blocks, with which it is coaxially arranged.

While the quantity of wire coiled on the blocks remains constant, the guide pulley **16** will rotate without causing the support means to pivot on the journal pin or shaft **9** relative to the blocks. In other words, the system is in equilibrium. On the other hand, should the wire be fed to and from the blocks at different speed, the amount of wire carried by the blocks will vary and result in a change of speed of the blocks, thereby disturbing the prevailing equilibrium of the system and causing the means **14** supporting the guide pulley **16** to swing in one direction or the other on the stationary journal pin or shaft **9** to an extent corresponding to the speed differential between the blocks. This pivoting movement of the support means **14** is used in accordance with the invention to re-establish the status of equilibrium in the system. Thus, the arrangement according to the invention automatically balances the sys-

tem, insomuch that the movements of the support means which are directly proportional to the speed differential between the blocks and thus also to the speed at which the wire is coiled thereon and uncoiled therefrom, is used to regulate the speed of the drawing block. This is effected in accordance with the invention by means of a transmission means which transmits the pivoting movements of the support means **14** to an angle detector **19** which in turn transmits signals corresponding to the pivoting movements of the support means **14** for the purpose of providing corresponding, compensatory changes in speed of the driven drawing block.

In the illustrated embodiment, the angle detector **19** comprises an electrical transducer, for example a transducer of the type commercially known as elgon transducer. The transducer is mounted in a manner such that one active portion thereof is secured to a portion of the lower frame structure **3**, for example the stationary bearing block **20**. The other active portion of the transducer is secured to a shaft **21** which is mounted for rotation in the shaft **2** supporting the drawing block **1**. The shaft **21** is arranged to project from the upper end of the shaft **2** and carries a device corresponding in form to the transmission device **17**, for example in the form of a belt pulley **22**.

In addition to an elgon transducer, the angle indicator **19** may comprise, for example, a rotary potentiometer or some other suitable means capable of transmitting a signal corresponding to the magnitude of the swinging movement of the support means **14**, for the purpose of providing a change in speed of the motor and/or the block compensatory to the movement of the supporting means. Thus, it is also possible to use a mechanical type of angle indicator for controlling the speed of the drawing block and thus a mechanical variator can be used, for example.

The transmission means for transmitting the pivoting movements of the supporting means **14** on the stationary journal pin or shaft **9** to the angle indicator **19** comprises, in addition to the mentioned transmission devices or belt pulleys **17, 22**, the element **18** which is securely mounted to the stationary journal pin or shaft **9**. Mounted for rotation in a sleeve **23** securely attached to the element **18** is a shaft whose ends project out from the sleeve on either side of the element **18**. The outwardly projecting ends of the shaft, which project into the interior of the support means **14** and the drawing block **1** each carry a device, for example the belt pulleys **24, 25**, corresponding to the transmission devices **17** and **22**. A belt **26** passes around the upper pulley **24** of the pulleys mounted on the shaft journalled in the sleeve **23** and the pulley **17** mounted in the support means **14**, while a second belt **27** passes around the pulley **22** connected to the angle indicator **19** via the shaft **21** and the lower pulley **25** of the pulleys mounted on the shaft journalled in the sleeve **23**.

It will be understood that the belt pulleys with associated belts described in connection with the illustrated embodiment may be exchanged for V-belt pulleys with associated V-belts, gears with chains or meshing gears, without departing from the purview of the invention.

In the occurrence of a speed differential between the blocks **1** and **11**, the support means **14** together with the belt pulley **17** will pivot on the stationary journal pin or shaft **9**. This movement is transmitted, via the belt **26**, the belt pulley **24**, the shaft journalled in the sleeve **23**, the belt pulley **25**, the belt **27**, the belt pulley **22** and the shaft **21**, to the angle indicator **19**, which transmits a signal to effect a compensating change in speed of the motor (not shown) driving the drawing block **1**.

The arrangement according to the invention is thus fully automatic, and is not restricted to the described and illustrated embodiment, but can be modified within the scope of the claims.

What is claimed is:

1. An arrangement in storage type wire drawing machines for continuously controlling the speed of an individually driven drawing block comprising:

a. a drive drawing block, mounted for rotation;

b. a guide block arranged coaxially to the drawing block and mounted for rotation;

c. a support means journalled between the drawing and guide blocks and being capable of pivoting movements therebetween in response to relative differences in rotational speed between the drawing and guide blocks;

d. a guide pulley is arranged between the drawing and guide blocks, said guide pulley is mounted for rotation on the support means;

e. a shaft journal means mounted above the drawing block to journal support both the support means and the guide block;

f. a machine element mounted for support on said shaft journal means between the drawing and guide blocks;

g. transmission means supported by said shaft journal means for transmitting a signal that corresponds to an angle formed by the pivoting movement of the support means; and

h. a device for transmitting a signal that corresponds to the pivoting angle of the support means for effecting a compensating change in rotational speed of the drawing block.

2. An arrangement according to claim **1** wherein the machine element forms part of the transmission means, a shaft is mounted for rotation in the machine element, a first means supported by one end of the shaft, a first corresponding co-operating means which with said first means is in movement transmitting connection with the support means, a second means which is supported at the other end of the shaft and a second corresponding co-operating means, said second means and said second corresponding co-operating means are in movement transmitting connection with the device.

3. An arrangement according to claim **2**, wherein said first and second corresponding co-operating means are in the form of belts, V-belts or chains.

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