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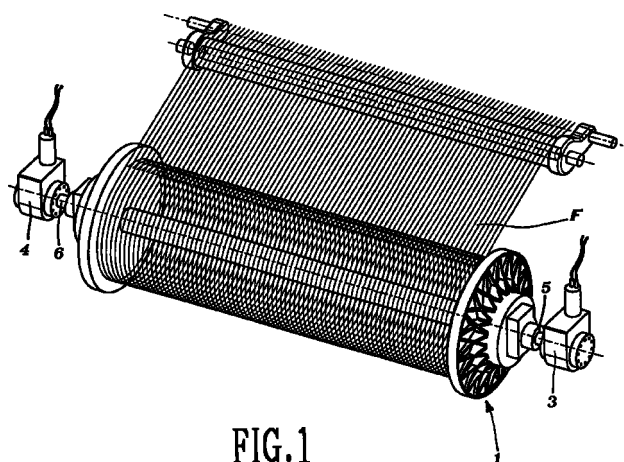
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(54) **Weaving loom having the warp beam driven by two actuators**

(57) In a weaving loom of the type in which the warp yarns - which are wound onto the beam and directed towards the fabric forming zone of the loom - are unwound by means of slow rotation of the beam itself and are kept at a controlled tension along their section between the yarn carrier and the fabric pulling device, said beam is driven at each of its ends by a corresponding actuator, said actuators, located on the sides of the

loom, performing a combined driving of the beam, so as to ensure controlled tension of the warp yarns. Advantageously said actuators are electric motors controlled electronically by sensors which detect the tension of the warp yarns and by a network for processing the associated signals.



**FIG.1**

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## Description

**[0001]** The present invention relates to an important improvement in driving the warp beam of weaving looms and achieves important advantages in terms of the design and operation of these textile machines.

**[0002]** It is known how, in weaving looms, the warp yarns directed towards the loom zone in which the fabric is formed, are wound onto at least one beam from which they are unwound by means of slow rotation of the beam itself and are kept at a controlled tension along their section, between the yarn carrier and the fabric pulling device. The slow rotation of the beam which ensures controlled unwinding of the warp yarns is at present always and exclusively performed with the aid of a single electric motor arranged on one side of the loom and connected by means of a mechanical transmission to the corresponding end of the beam shaft.

**[0003]** The drawbacks which arise from this arrangement, in particular in the case of so-called "long" looms, are obvious: the considerable torsional stresses which occur along the length of the beam shaft and the high tension of the warp yarns in fact result in the need to design the various component parts and in particular said shaft with excessively large dimensions and in the use of large quantities of energy.

**[0004]** The present invention aims to eliminate these drawbacks and provides for this purpose a weaving loom of the type in which the warp yarns - which are wound onto the beam and directed towards the fabric forming zone of the loom - are unwound by means of slow rotation of the beam itself and are kept at a controlled tension along their section between the yarn carrier and the fabric pulling device, characterized in that said beam is driven at each of its two ends by a corresponding actuator, said actuators, located on the sides of the loom, performing a combined driving of the beam, so as to ensure controlled tension of the warp yarns.

**[0005]** In a preferred embodiment, said actuators for the combined driving of the beam are electric motors controlled by electronic means which detect and manage one or more characteristic parameters of the chain of warp yarns, including the tension of said yarns.

**[0006]** The invention is now described in greater detail, with reference to the accompanying drawings which illustrate a currently preferred embodiment thereof and in which:

Fig. 1 is a general illustration the new method of performing rotation of the beam in a weaving loom having a single beam according to the invention;

Fig. 2 is a diagram showing the arrangement of the network of sensors for signalling the tension of the warp chain; and

Fig. 3 is a diagram showing the arrangement of the system for controlling the warp chain, consisting of the actuators provided at the ends of the beam and the sensors for detecting the tension of the yarn.

**[0007]** With reference to Fig. 1 of the drawings, the weaving loom according to the invention provides, in a known manner, a single beam 1 from which the warp yarns F, directed towards the fabric forming zone and suitably supported by a yarn carrier 2, are unwound.

**[0008]** In order to perform the slow rotation of the beam 1 which determines unwinding of the yarns F, the loom is provided, according to the invention, with two actuators 3 and 4 which are located on the sides of the loom and which drive the corresponding ends 5 and 6 of the shaft of the beam 1. In practice, said actuators 3 and 4 consist of electric motors which can be controlled electronically. Still according to the invention, devices 7, 8 and 9 for measuring - directly or indirectly - the tension of the warp yarns or another typical parameter of the warp chain are provided (Fig. 2), said devices being able to detect said parameter respectively close to the yarn carrier, halfway along the warp chain and close to the fabric pulling device.

**[0009]** The system for controlling unwinding of the warp beam is shown in Fig. 3: the signal detected by the sensors 7, 8 and 9 for the typical parameter of the warp chain, which is processed by a microprocessor or, more generally, by a processing network 10, is sent to the pair of actuators 3 and 4 so as to perform in a combined manner the unwinding of the beam controlled by them.

**[0010]** The actuators 3 and 4, which consist of a main actuator and a slave actuator, are controlled by electronic control units 11 and 12, communicating with each other and with the processing network 10, so as to ensure the synchronized adaptation of the speed of rotation of the ends of the beam controlled by the actuators with respect to a suitable distribution of the torque, in order to manage the energy consumption.

**[0011]** According to a preferred method of organization of the control system, in order to avoid having a different value of the twisting torque at the two ends of the beam, the following procedure is used: the electric current characterizing the type of electrical actuation at the ends of the beam, in both the actuators, is measured; the electric current value of the control unit of the master actuator is sent to the control unit of the slave actuator; the associated values are compared; depending on the difference determined in said comparison, an (angular) offset position is added to that of the slave actuator, so as to obtain in it the same current value as the master actuator.

**[0012]** It is obvious that, with an arrangement such as that described, it is possible to distribute in a suitable manner the torsional stresses of the shaft of the beam 1 and consequently reduce the dimensions thereof, with obvious advantages for the design and the operation of the loom. This advantage is especially important in the case of "long" looms which are intended for weaving double-width pieces or, more frequently, for weaving together two pieces of normal width.

**[0013]** It is understood moreover that the embodiments of the loom described and illustrated and the

modifications thereof could be different from those described, all of which obviously falling within the scope of the present invention.

## Claims

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1. Weaving loom of the type in which the warp yarns - which are wound onto the beam and directed towards the fabric forming zone of the loom - are unwound by means of slow rotation of the beam itself and are kept at a controlled tension along their section between the yarn carrier and the fabric pulling device, characterized in that said beam is driven at each of its two ends by a corresponding actuator, said actuators, located on the sides of the loom, performing a combined driving of the beam, so as to ensure controlled tension of the warp yarns. 10 15
2. Loom as claimed in Claim 1, wherein, for the combined driving of the beam, said actuators are electric motors controlled by electronic means which detect and manage one or more characteristic parameters of the chain of warp yarns, including the tension of said yarns. 20 25
3. Loom as claimed in Claims 1 and 2, wherein said electronic means comprise sensors arranged along the warp yarns, a network for processing the associated signals and two control units for controlling the said motors, communicating with each other and with said processing network. 30 35
4. Loom as claimed in Claims 1 to 3, in which one of said actuators is a master actuator and the other one a slave actuator. 35 40 45 50 55

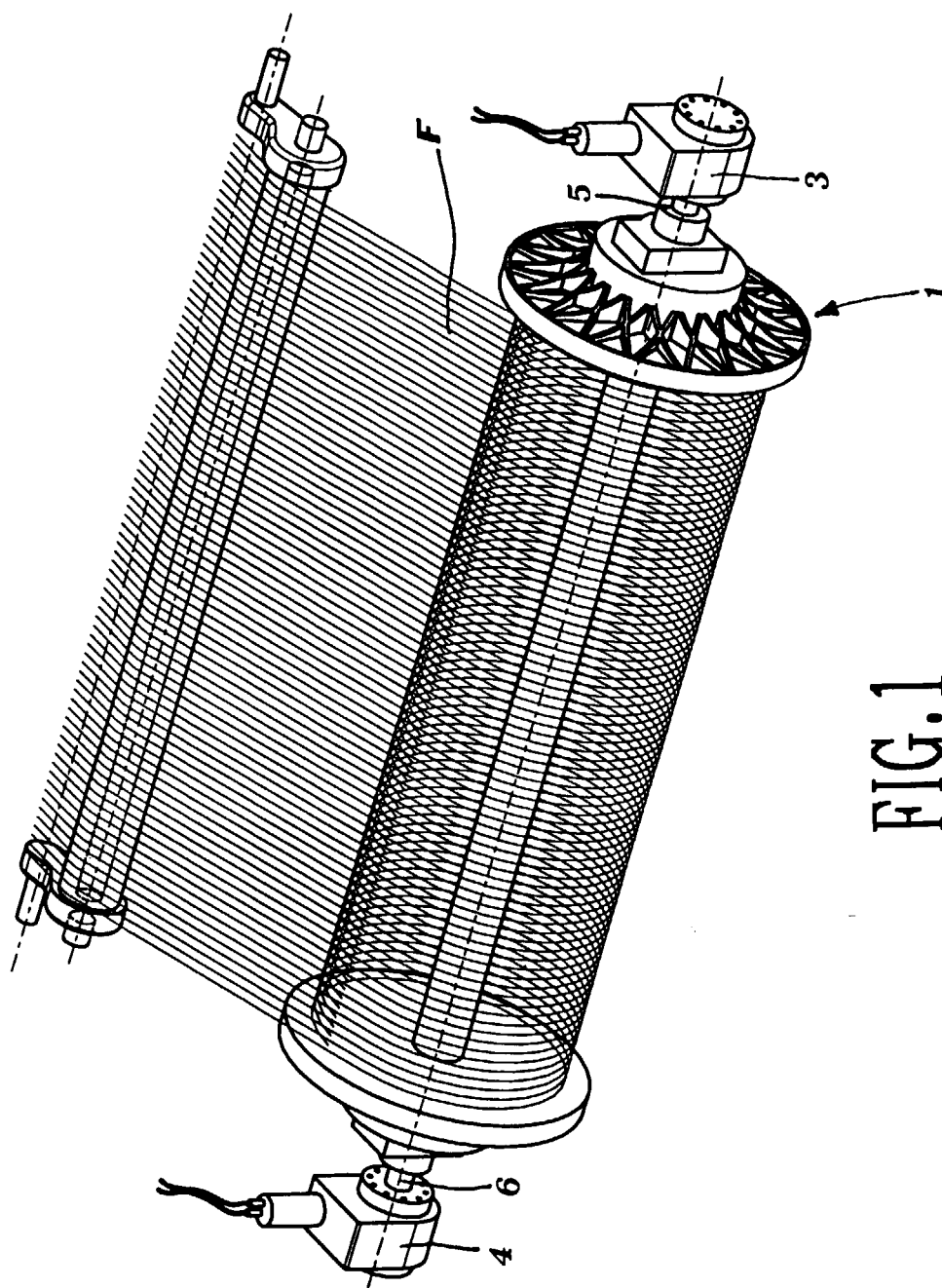
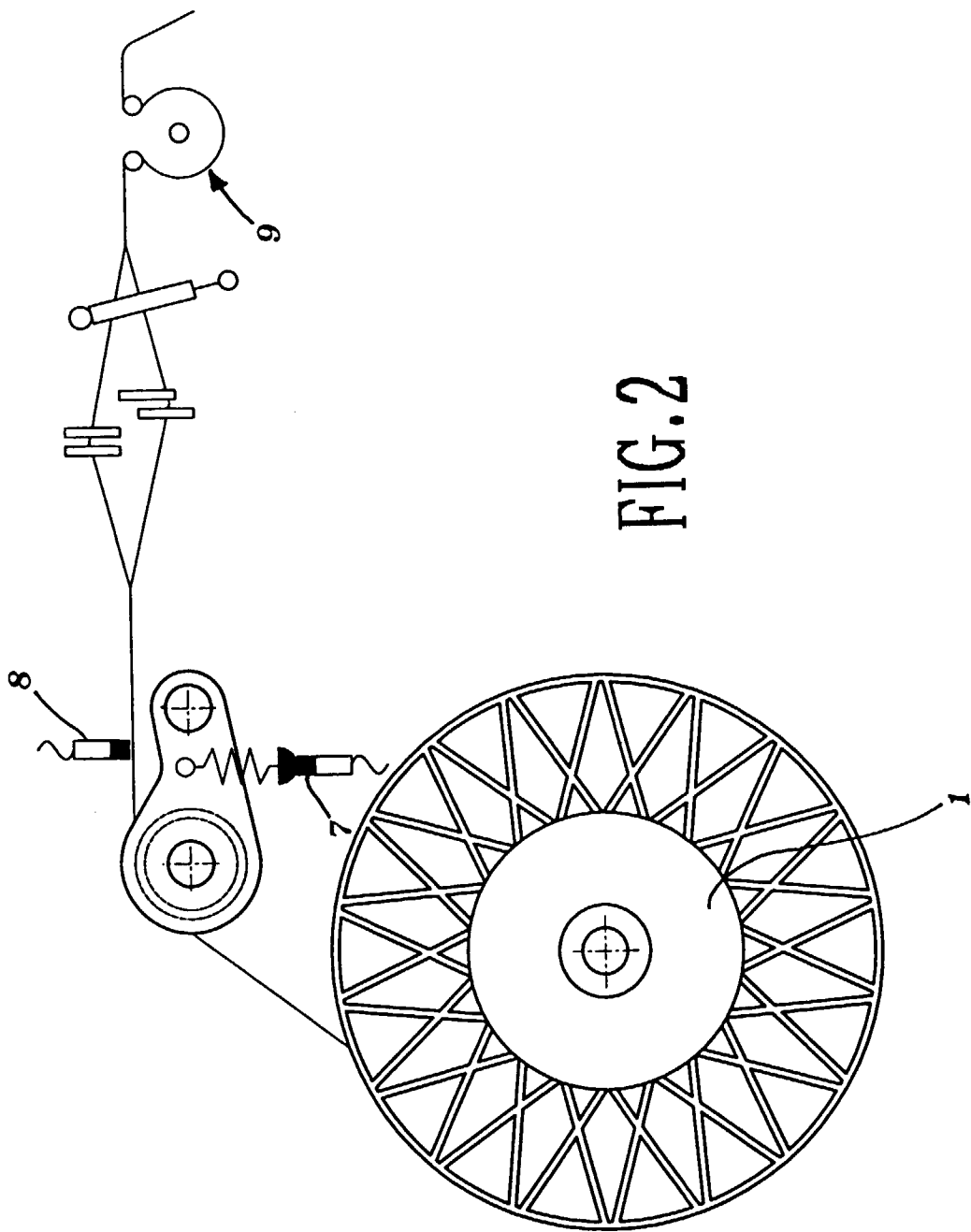


FIG. 1



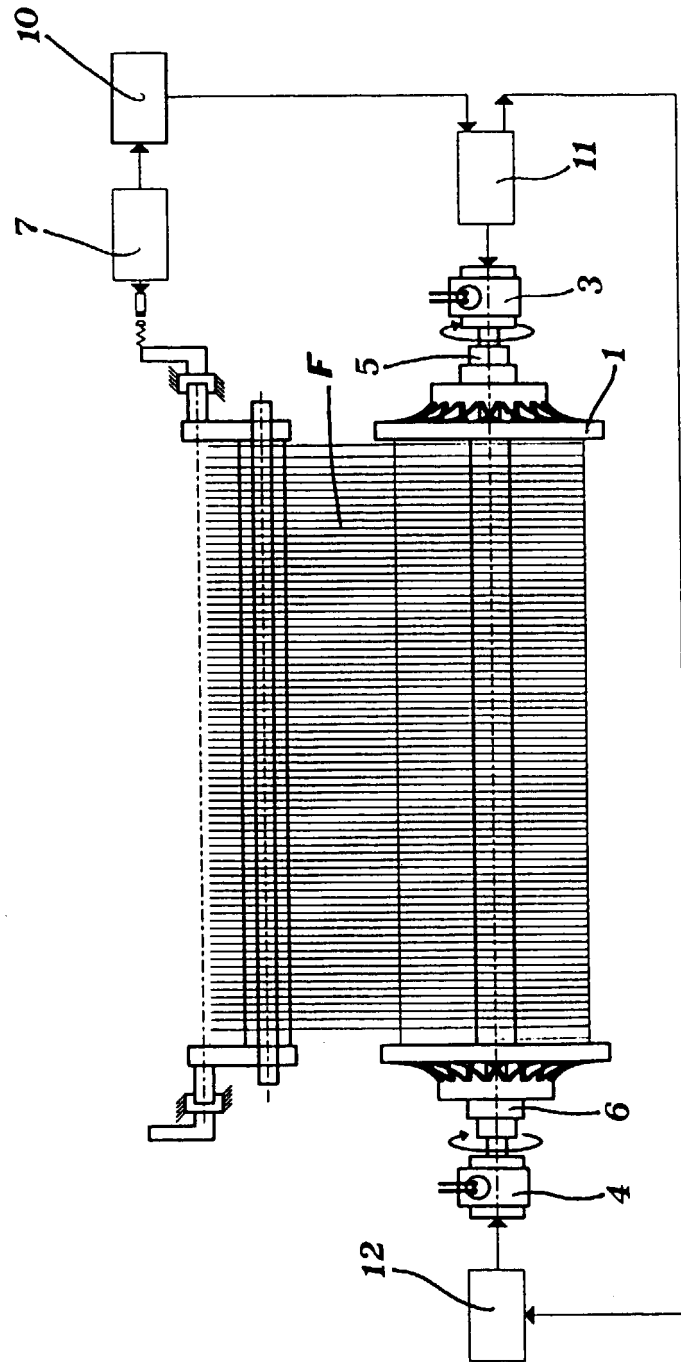


FIG.3