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CH DE ES FR GB IT LI(71) Applicant: **OMD OFFICINA MECCANICA
DOMASO S.p.A.
Via Statale, 193
I-22013 Domaso (Como) (IT)**(72) Inventor: **Gibuzzi, Claudio, OMD OFFICINA
MECCANICA**

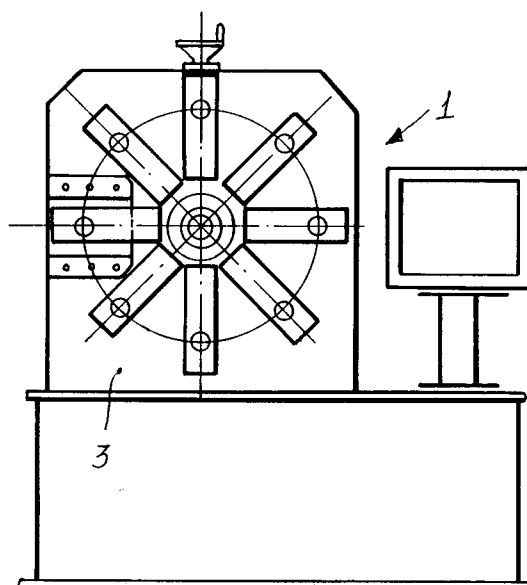
**DOMASO S.p.A.,
Via Statale, 193
I-22013 Domaso (Como) (IT)**
Inventor: **Bassi, Albino, OMD OFFICINA
MECCANICA
DOMASO S.p.A., Via Statale, 193
I-22013 Domaso (Como) (IT)**

(74) Representative: **Cicogna, Franco
Ufficio Internazionale Brevetti
Dott.Prof. Franco Cicogna
Via Visconti di Modrone, 14/A
I-20122 Milano (IT)**

(54) **Wire transport assembly for bending and winding machines.**

(57) The present invention relates to a wire transport assembly which has been specifically designed for wire bending and winding machines (1) comprising, on the machine frame (2), a wire guiding assembly (10) for supplying the wire towards the bending or winding center.

The main feature of the invention is that said wire guiding assembly (10) can be turned through substantially 90° about an axis which is substantially perpendicular to the axis of the wire in order to feed the wire parallel to the machine plane (3) and at 90° with respect this machine plane (3).

*Fig. 1***EP 0 682 997 A1**

BACKGROUND OF THE INVENTION

The present invention relates to a wire transport assembly, which has been specifically designed for application to wire bending and winding machines.

As known, there are already available wire bending and winding machines which transport the wire parallel to the front plane of the machine, towards the bending center.

The wire, which is entrained by transport rollers towards the forming center, is bent by one or more bending slides which are mounted on the frontal plane or panel of the machine.

These machines are conventionally used for making pulling springs provided either with English or German eyelets, as well as compression springs and twist springs provided with bent stems.

There are moreover known machines in which the wire is fed through the machine and exit therefrom at 90° with respect to the processing plane of the machine.

Also in this construction, the wire is bent by tools which are mounted on the bending slides.

The wire entraining rollers including one or more pair of rollers, are motor driven and possibly controlled by an electronic control unit, and are fixedly mounted on the wire processing machines.

In the prior art, accordingly, there are provided two different types of machines.

More specifically, a first type is provided with a wire feeding parallel to the front portion of the machine, whereas the other is provided with a wire feeding at 90° with respect to the machine processing plane, depending on the different type of processing to be performed.

This fact originates great drawbacks, since the user must have available two different types of machines, depending on the applications to be made.

SUMMARY OF THE INVENTION

Accordingly, the aim of the present invention is to overcome the above mentioned drawbacks, by providing a wire transport assembly, specifically designed for wire bending and winding machines, which allows to include therein the typical features of the two above mentioned prior machines thereby providing the possibility of performing two different types of wire feedings, depending on the different processes to be performed.

Within the scope of the above mentioned aim, a main object of the present invention is to provide such a wire transport assembly which allows to change the configuration of the wire processing machine in a very quick and simple manner.

Another object of the present invention is to provide a wire transport assembly which, owing to its constructional features, is very reliable and safe in operation.

Yet another object of the present invention is to provide such a wire transport assembly for wire bending and winding machines which can be easily made starting from easily available elements and materials and which, moreover, is very competitive from a mere economic standpoint.

According to one aspect of the present invention, the above mentioned aim and objects, as well as yet other objects, which will become more apparent hereinafter, are achieved by a wire transport assembly, specifically designed for wire bending and winding machines, comprising, on a machine frame, a wire guiding assembly for feeding said wire towards a bending or winding center, characterized in that said wire guiding assembly is adapted to turn through substantially 90° about an axis which is substantially perpendicular to the axis of the wire in order to feed said wire parallel to the plane of said machine and at 90° with respect to said plane of said machine.

BRIEF DESCRIPTION OF THE DRAWING

Further characteristics and advantages of the invention will become more apparent hereinafter from the following detailed disclosure of a preferred, through not exclusive, embodiment of a wire transport assembly, specifically designed for wire bending and winding machine, which is illustrated, by way of an indicative, but not limitative, example in the figures of the accompanying drawings, where:

Figure 1 is a front elevation view illustrating the subject wire transport assembly applied to a machine of the spring-former type;

Figure 2 is a top plan view illustrating the spring-former machine shown in Figure 1;

Figure 3 is a front elevation view illustrating the machine with a side inlet for the wire, said machine being provided for using as a wire winding and wire eyelet forming machine;

Figure 4 is a side elevation view illustrating the machine shown in Figure 3;

and

Figure 5 is a top plan view of the machine of Figure 3, with the wire guiding assembly arranged at a different position.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to the above mentioned figures, the wire transport assembly, specifically designed for wire bending and winding machines, according

to the present invention, comprises a machine, generally indicated at the reference number 1, which includes a bearing frame 2 defining at the front thereof a plane or bearing surface 3 or panel therein are provided working or processing assemblies which consist, preferably, though not exclusively, of one or more wire bending slides 4 mounted on said bearing surface or panel.

The main feature of the invention is that there is provided a wire guiding assembly 10, including one or more pairs of electronically controlled motor driven rollers 11, said wire guiding assembly 10 being arranged so as to be able of turning through 90° about an axis which is substantially perpendicular to the axis of the wire 20 being fed or supplied.

Thus, a single machine is obtained which can fed or supply the wire either parallel to the bearing surface of the machine, in the case in which this machine is to be used as a wire winding machine, or a wire bending or eyelet forming machine, or, as shown in Figure 2, perpendicularly to the laying plane of the machine, in the case in which the machine is to be used as a conventional spring forming machine.

The wire 20, in particular, can be fed or withdrawn with a very great accuracy, through the wire guiding assembly which, as disclosed in a previous patent application of the same Applicant (Italian patent application MI92A 000988) which is included herein by reference, can turn about the axis of the wire; accordingly it is possible to combine two movements, that is the rotation of the wire guiding assembly about a perpendicular axis in order to perform a double location with a double use of the machine, and the rotation of the wire guiding assembly about the axis of the wire.

In this connection it should be pointed out that the rotary movement of the wire guiding assembly is also electronically controlled and motor driven.

From the above disclosure it should be apparent that the invention fully achieves the intended aim and objects.

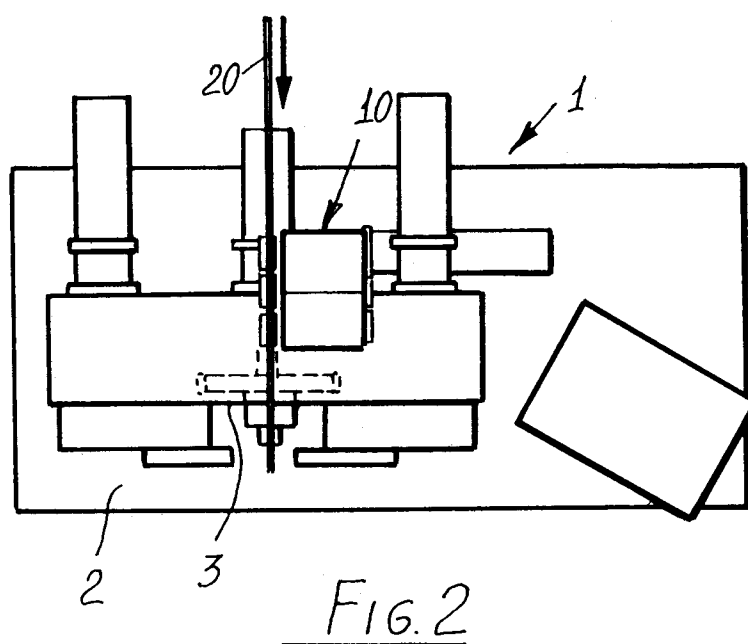
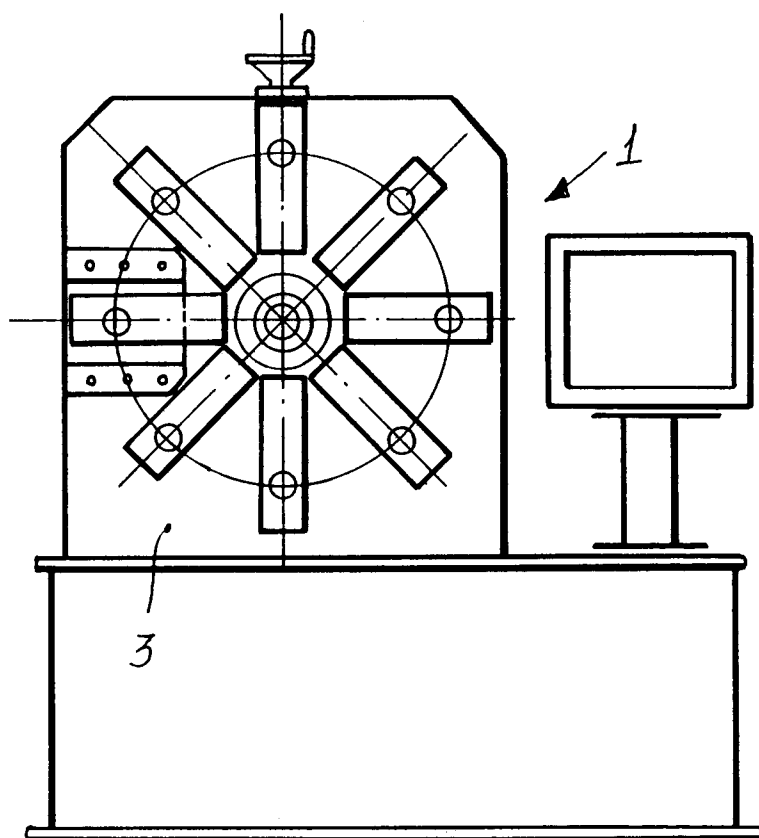
In particular the fact is to be pointed out that a wire transport assembly has been provided which allows to include in a single machine two functions, which are at present made by two different machines, by simply providing a wire guiding assembly adapted to be rotated through 90° about an axis perpendicular to the axis of the wire, so as to provide, on the same machine, both a wire feeding perpendicular to the working plane of the machine, and a wire feeding turned through 90°, in parallel to the working plane.

The invention as disclosed is susceptible to several modifications and variations, all of which will come within the scope of the inventive idea.

Moreover, all of the constructional details can be replaced by other technically equivalent elements.

Claims

1. A wire transport assembly, specifically designed for wire bending and winding machines, comprising, on a machine frame, a wire guiding assembly for feeding said wire towards a bending or winding center, characterized in that said wire guiding assembly is adapted to turn through substantially 90° about an axis which is substantially perpendicular to the axis of the wire in order to feed said wire parallel to the plane of said machine and at 90° with respect to said plane of said machine.
2. A wire transport assembly, according to Claim 1, characterized in that said wire guiding assembly comprises at least a pair of motor driven rollers which are electronically controlled.
3. A wire transport assembly, according to Claims 1 and 2, characterized in that said wire guiding assembly can turn about an axis defined by the wire feeding direction.



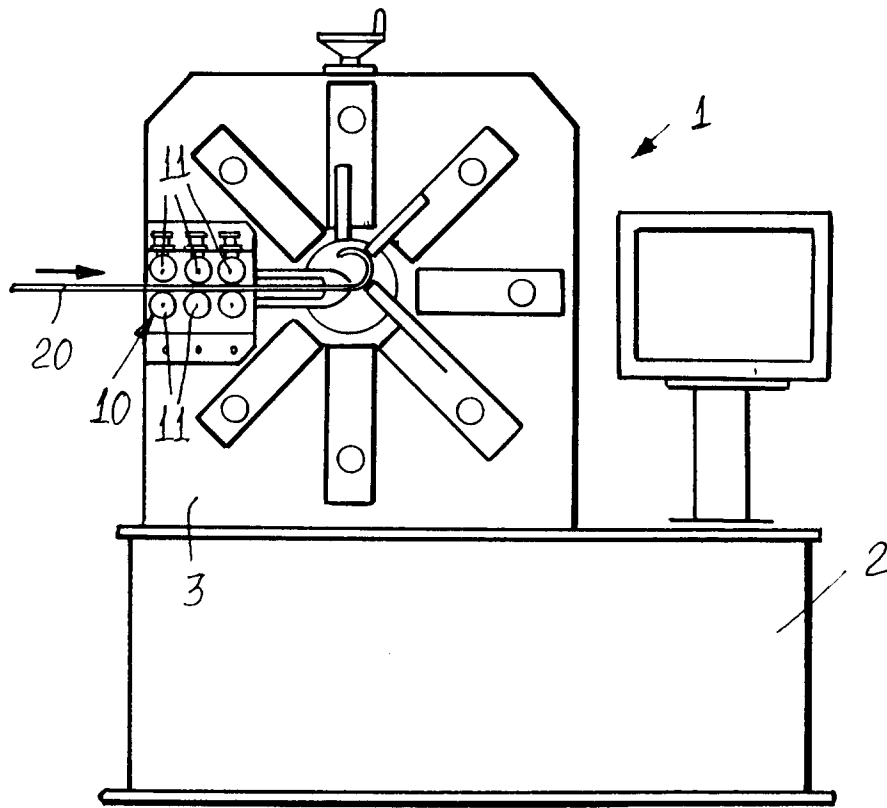


FIG. 3

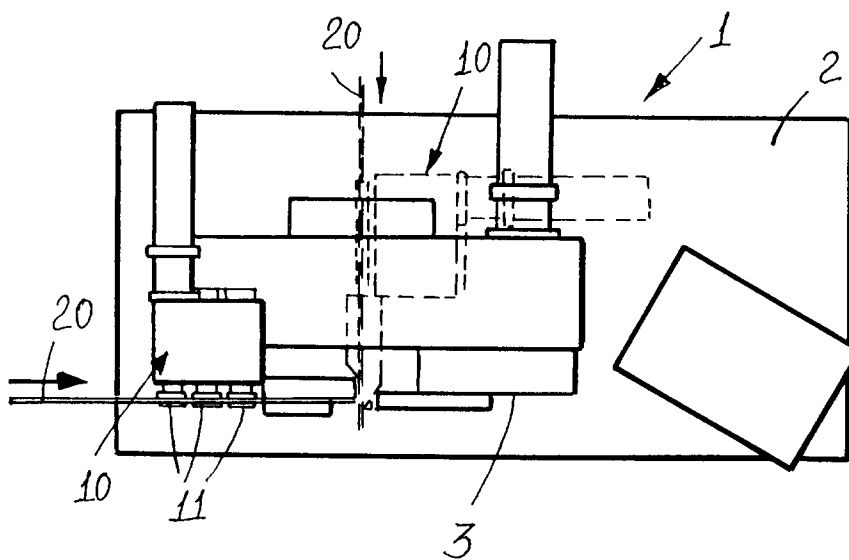


FIG. 5

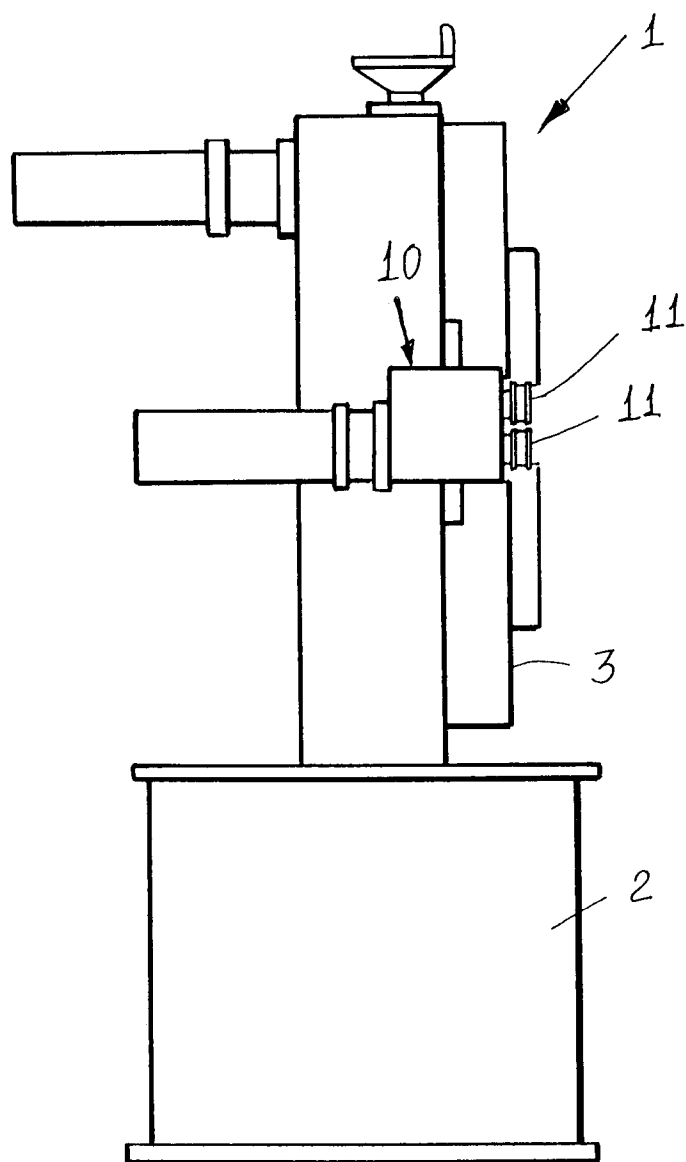


FIG. 4



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EUROPEAN SEARCH REPORT

Application Number
EP 94 83 0458

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
Y	US-A-4 893 491 (OHDAI YOZO ET AL) 16 January 1990 * column 4, line 24 - line 65; figures * ---	1,2	B21F3/027 B21F23/00
Y	GB-A-1 317 374 (VNII MED INSTR) 16 May 1973 * page 2, line 16 - line 51; figures * ---	1,2	
A	DE-C-42 29 294 (WAFIOS MASCHINEN WAGNER) 16 December 1993 * column 2, line 37 - column 3, line 8; figures * ---	3	
A	US-A-4 696 175 (SKUPIEN EUGENE M) 29 September 1987 * abstract; figures * -----	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B21F
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 14 July 1995	Examiner Garella, M
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application I : document cited for other reasons ----- & : member of the same patent family, corresponding document			