



(11)

EP 1 652 986 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
03.05.2006 Bulletin 2006/18

(51) Int Cl.:
D05B 73/00 (2006.01) D05B 75/00 (2006.01)

(21) Application number: **05023417.8**

(22) Date of filing: **26.10.2005**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR MK YU

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(30) Priority: **02.11.2004 JP 2004319690**

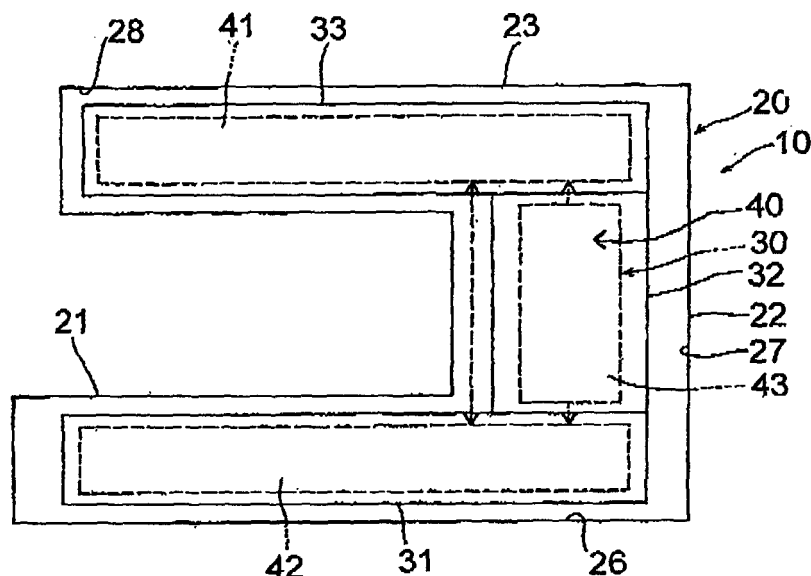
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(54) **Sewing machine**

(57) A sewing machine (10) including a resin casing (20) constituted by integral molding of a base portion (21), a pillar portion (22), and an arm portion (23), and a sewing mechanism (40) having a sewing function and accommodated in an inner space (25) formed by a first inner space (26) of the base portion, a second inner space (27) of the pillar portion, and a third inner space (28) of the arm portion connected to one another characterized in

that the sewing mechanism is accommodated within the frame so as to be supported by a frame member (30), made up of a base frame (31) that has been pressed and faces the base portion, a pillar frame (32) that has been pressed and is assembled on one end of the base frame so as to face the pillar portion, and an arm frame (33) that has been pressed and is assembled on the pillar frame so as to face the arm portion.

FIG. 1



Description

FIELD OF THE INVENTION

[0001] This invention generally relates to a sewing machine. More particularly, this invention pertains to an internal structure of a casing of a sewing machine.

BACKGROUND

[0002] A known sewing machine includes a sewing mechanism within a casing. JP2003-169989 discloses a sewing mechanism supported within a reinforced resin casing.

[0003] According to the sewing machine disclosed, the sewing mechanism is supported within the reinforced resin casing and thus the casing is stable even if vibration is generated by the sewing mechanism at a time that the sewing machine is operated. For example, problems such as fluctuation in a position of a needle as it penetrates into a fabric may be prevented.

[0004] In order to reinforce a resin casing against vibration, i.e. strength reinforcement, however, a great number of ribs have to be formed within the resin casing, and this may cause troublesome complications in the molding of the resin casing. In addition, since the sewing mechanism is arranged within the resin casing, the ribs have to be formed so as not to interfere with the sewing mechanism. As a result, it may on occasions be difficult to obtain a resin casing of a specified degree of strength.

[0005] Thus, a need exists for a sewing machine that can acquire a specified degree of strength of a resin casing with a simple structure.

SUMMARY OF THE INVENTION

[0006] According to an aspect of the present invention, a sewing machine including a resin casing constituted by integral molding of a base portion, a pillar portion extending upward from one end of the base portion, and an arm portion extending from the pillar portion so as to be located over the base portion, and a sewing mechanism having a sewing function and accommodated in an inner space formed by a first inner space of the base portion, a second inner space of the pillar portion, and a third inner space of the arm portion connected to one another characterized in that the sewing mechanism is accommodated within the frame so as to be supported by a frame member, made up of a base frame that has been pressed and faces the base portion, a pillar frame that has been pressed and is assembled on one end of the base frame so as to face the pillar portion, and an arm frame that has been pressed and is assembled on the pillar frame so as to face the arm portion.

[0007] According to the aforementioned invention, the sewing mechanism is supported by the frame member including three divided frames that have been pressed. Thus, the resin casing is freed from the need for a vibra-

tion resistance structure in relation to the sewing mechanism, and the structure of the sewing machine may thereby be simplified.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The foregoing and additional features and characteristics of the present invention will become more apparent from the following detailed description considered with reference to the accompanying drawings, wherein:

[0009] Fig. 1 is a schematic view of an inside of a casing of a sewing machine according to an embodiment of the present invention;

[0010] Fig. 2 is a perspective view of the casing of the sewing machine shown in Fig. 1;

[0011] Fig. 3 is a perspective view of a frame member accommodated in the casing shown in Fig. 2;

[0012] Fig. 4 is an exploded perspective view of the frame member shown in Fig. 3;

[0013] Fig. 5 is a side view for illustrating a state in which an upper shaft unit is assembled onto an arm frame of the frame member shown in Figs. 3 and 4;

[0014] Fig. 6 is a plane view of a state shown in Fig. 5.

[0015] Fig. 7 is a side view of a state shown in Fig. 5 as viewed from the left side;

[0016] Fig. 8 is a plane view for illustrating a state in which a lower shaft unit is assembled onto a base frame of the frame member shown in Figs. 3 and 4;

[0017] Fig. 9 is a front view of the state shown in Fig. 8;

[0018] Fig. 10 is a side view of the state shown in Fig. 8 as viewed from the right side;

[0019] Fig. 11 is a side view for illustrating a state in which a pattern generation unit is assembled onto a pillar frame of the frame member shown in Figs. 3 and 4;

[0020] Fig. 12 is a plane view of the state shown in Fig. 11; and

[0021] Fig. 13 is a perspective view of the state shown in Fig. 5.

DETAILED DESCRIPTION

[0022] An embodiment of the present invention is explained with reference to the attached drawings.

[0023] As shown in Figs. 1 and 2, a sewing machine 10 includes a resin casing 20. The resin casing 20 is constituted by integral molding of a base portion 21 placed on a workbench (not shown), a pillar portion 22 extending upward from one end of the base portion 21, and an arm portion 23 extending from the pillar portion 22 so as to be located over the base portion 21, or opposed to the base portion 21.

[0024] An inner space 25 of the resin casing 20 is formed by a first inner space 26 of the base portion 21, a second inner space 27 of the pillar portion 22, and a third inner space 28 of the arm portion 23, connected to one another so as to define a single space. As shown in Figs. 1 and 2, the inner space 25 of the resin casing 20 is in an open state but in practice the open side of the

inner space 25 is covered by a cover member (not shown).

[0025] A sewing mechanism 40, having a sewing function and supported by a frame member 30 as shown in Figs. 1, 3 and 4, is accommodated in the inner space 25 of the resin casing 20. The frame member 30 is made up of three frames, i.e. a base frame 31, a pillar frame 32 and an arm frame 33, formed by pressing of a steel plate. The frame member 30 is protected by the rigidity of its structure from the effects of vibration of the sewing mechanism 40. The base frame 31, the pillar frame 32, and the arm frame 33 of the frame member 30 are accommodated respectively in the first inner space 26 of the base portion 21, the second inner space 27 of the pillar portion 22, and the third inner space 28 of the arm portion 23. The arm frame 33 is assembled onto the pillar frame 32 in a cantilever manner as shown in Fig. 4. In addition, the arm frame 33 is horizontally asymmetrical and vertically uneven. Thus, in order to prevent deflection and distortion, for purpose of reinforcement of the arm frame 33, a tip end portion formed on an upper side of the arm frame 33 and a base portion formed on a lower side of the arm frame 33 (i.e. a portion close to the pillar frame 32) are connected to each other by means of a beam member 34.

[0026] The three frames, i.e. the base frame 31, the pillar frame 32, and the arm frame 33, are assembled in the following manner. First, holes are formed on respective overlapping fitting portions of adjacent frames. Then, each screw (not shown) is screwed into two holes facing each other. Such an assembly method, i.e. connecting structure, is known and thus a detailed explanation is omitted. According to the aforementioned connecting structure, a deflection portion may not exist between the base frame 31 and the pillar frame 32, or between the pillar frame 32 and the arm frame 33. Thus, frame member 30 may have high deflection rigidity. The connecting structure may also be achieved by a means such as welding, riveting, or fitting, instead of screwing.

[0027] The sewing mechanism 40 includes an upper shaft mechanism, a lower shaft mechanism, and a pattern generation mechanism, as is a known structure. The upper shaft mechanism, the lower shaft mechanism, and the pattern generation mechanism are unitized respectively as an upper shaft unit 41, a lower shaft unit 42, and a pattern generation unit 43. As shown in Figs. 5 to 7, the upper shaft unit 41 is arranged and supported within the arm frame 33. In addition, as shown in Figs. 8 to 10, the lower shaft unit 42 is arranged and supported within the base frame 31. Further, the pattern generation unit 43 is arranged and supported within the pillar frame 32, as shown in Figs. 11 to 13.

[0028] In cases where a change of specification is made, such as for example changing the upper shaft mechanism, the lower shaft mechanism, or the pattern generation mechanism, the arm frame 33, the base frame 31, or the pillar frame 32 may be replaced by another arm frame, another base frame, or another pillar frame

respectively equipped with an upper shaft unit, a lower shaft unit, and a pattern generation unit, such that such the specification change may be achieved in a simple manner.

- 5 A sewing machine (10) including a resin casing (20) constituted by integral molding of a base portion (21), a pillar portion (22), and an arm portion (23), and a sewing mechanism (40) having a sewing function and accommodated in an inner space (25) formed by a first inner space (26) of the base portion, a second inner space (27) of the pillar portion, and a third inner space (28) of the arm portion connected to one another characterized in that the sewing mechanism is accommodated within the frame so as to be supported by a frame member (30), made up of a base frame (31) that has been pressed and faces the base portion, a pillar frame (32) that has been pressed and is assembled on one end of the base frame so as to face the pillar portion, and an arm frame (33) that has been pressed and is assembled on the pillar frame so as to face the arm portion.

Claims

- 25 1. A sewing machine (10) comprising a resin casing (20) constituted by integral molding of a base portion (21), a pillar portion (22) extending upward from one end of the base portion, and an arm portion (23) extending from the pillar portion so as to be located over the base portion, and a sewing mechanism (40) having a sewing function and accommodated in an inner space (25) formed by a first inner space (26) of the base portion, a second inner space (27) of the pillar portion, and a third inner space (28) of the arm portion connected to one another **characterized in that** the sewing mechanism is accommodated within the frame so as to be supported by a frame member (30), made up of a base frame (31) that has been pressed and faces the base portion, a pillar frame (32) that has been pressed and is assembled on one end of the base frame so as to face the pillar portion, and an arm frame (33) that has been pressed and is assembled on the pillar frame so as to face the arm portion.
- 30 2. A sewing machine (10) according to claim 1, wherein respective ends of the arm frame (33) are connected to each other by means of a beam member (34).

FIG. 1

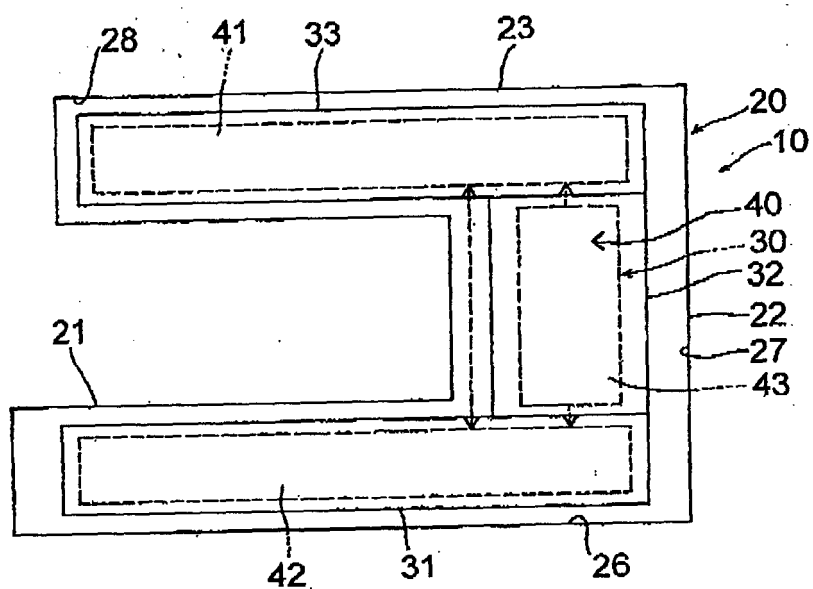


FIG. 2

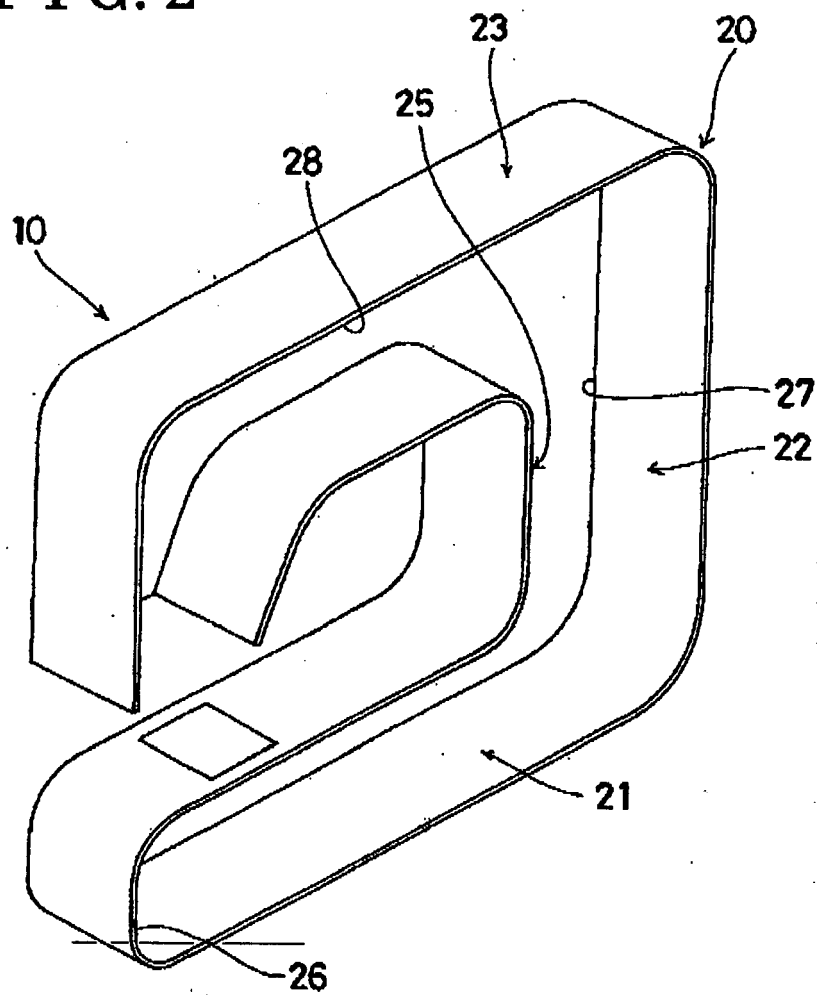


FIG. 3

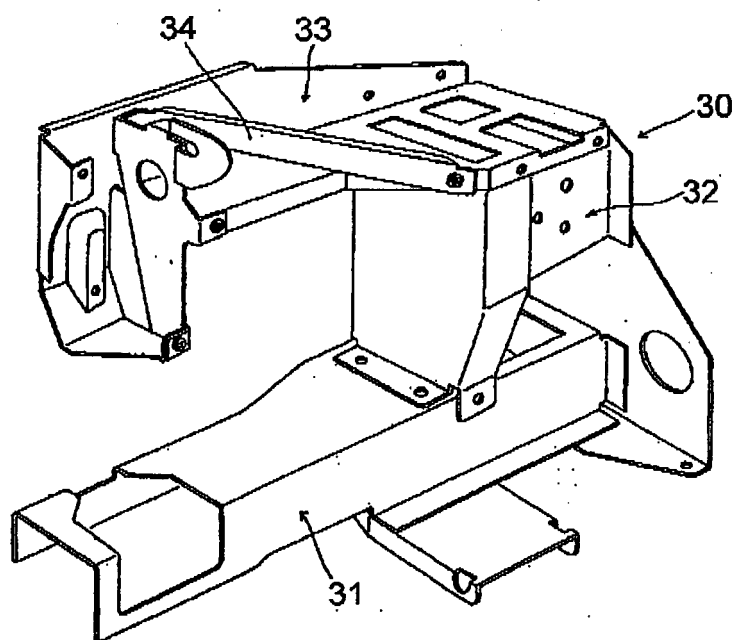


FIG. 4

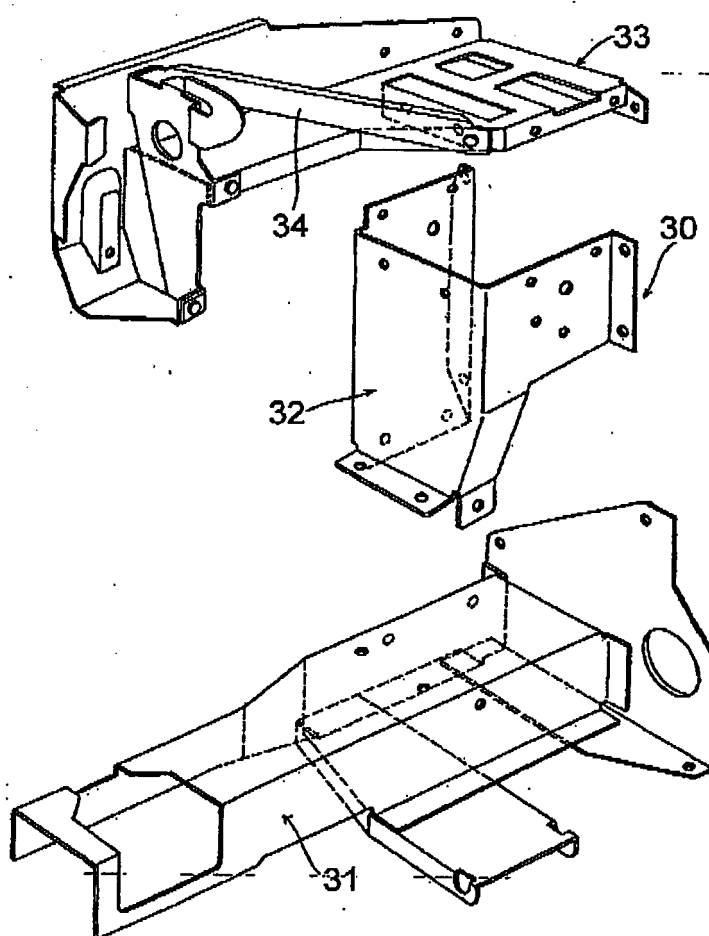


FIG. 5

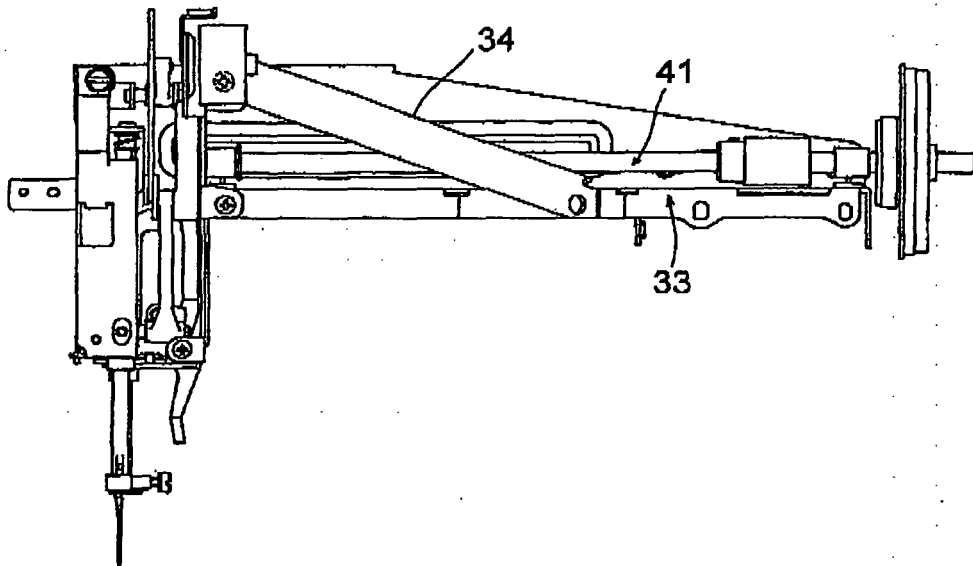


FIG. 6

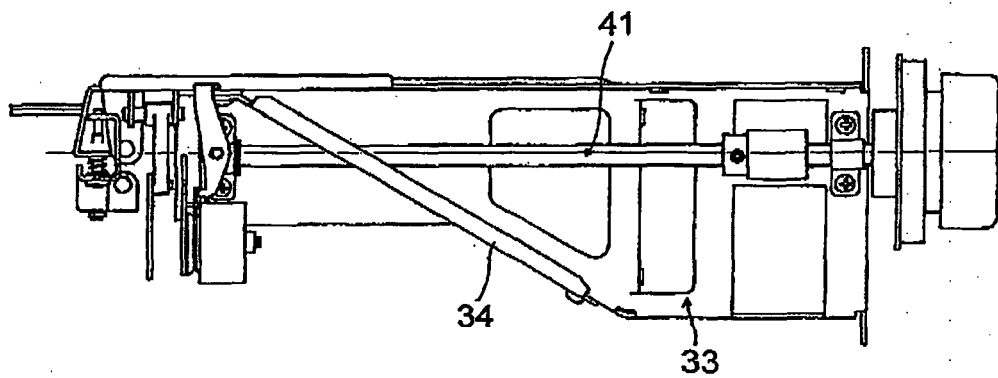


FIG. 7

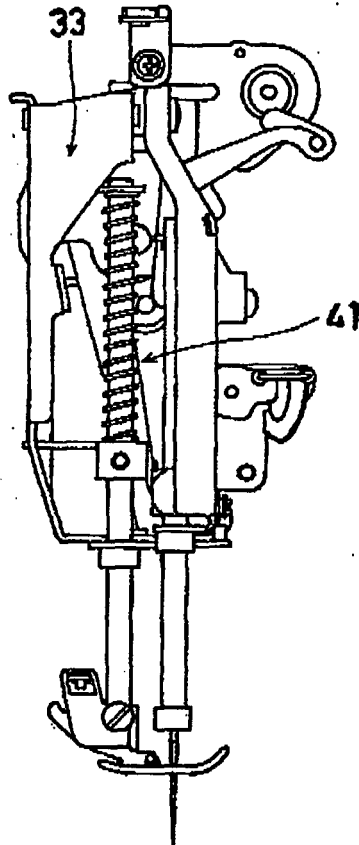


FIG. 8

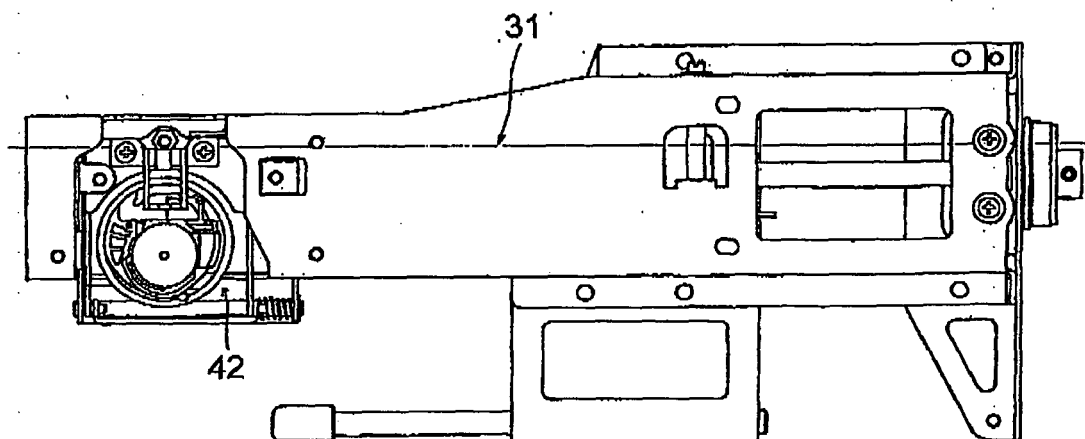


FIG. 9

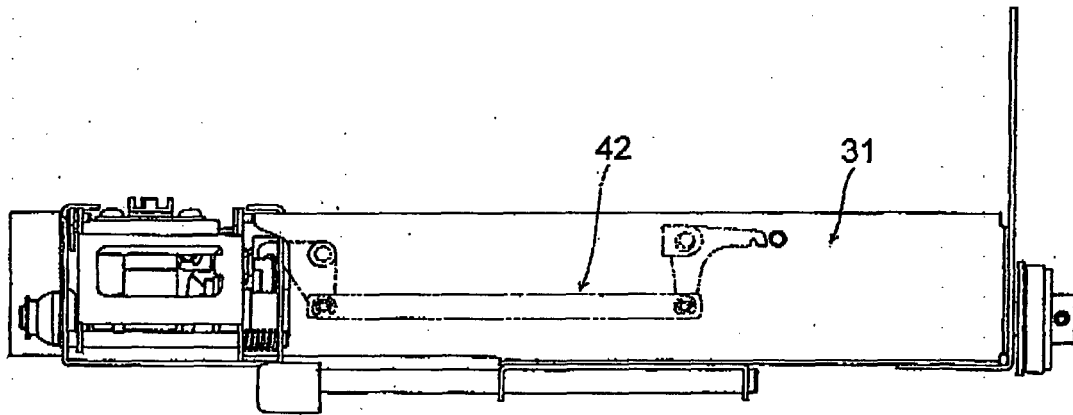


FIG. 10

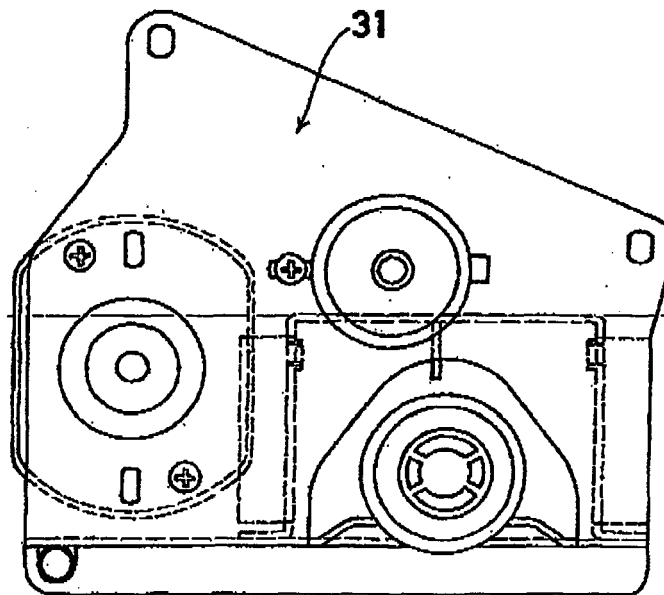


FIG. 11

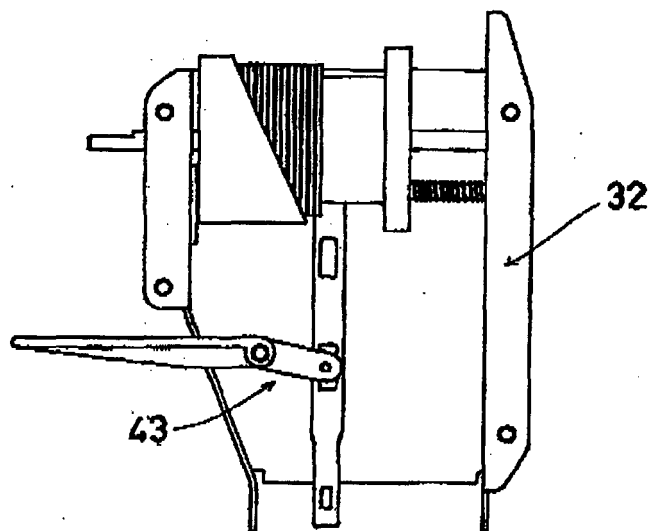


FIG. 12

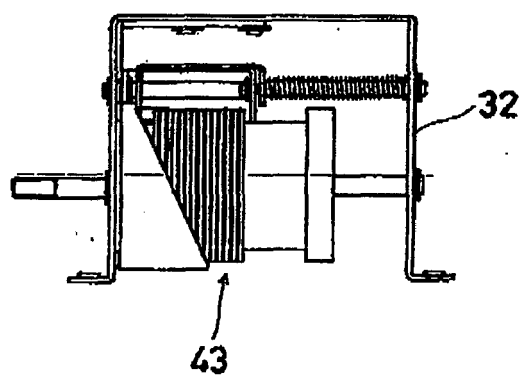
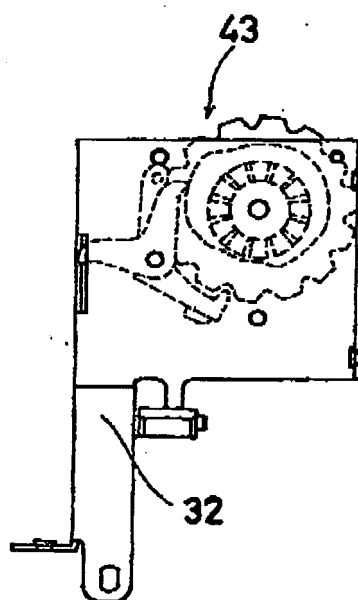


FIG. 13





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 05 02 3417

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 2003/066466 A1 (OGI TAKESHI ET AL) 10 April 2003 (2003-04-10) * paragraph [0044] - paragraph [0137]; figures 1-15 *	1,2	D05B73/00 D05B75/00
A	----- PATENT ABSTRACTS OF JAPAN vol. 1999, no. 10, 31 August 1999 (1999-08-31) & JP 11 137880 A (KOBEL STEEL LTD), 25 May 1999 (1999-05-25) * abstract; figures 1-10 *	1,2	
A	----- US 4 651 662 A (BRAUCH ET AL) 24 March 1987 (1987-03-24) * column 2, line 44 - column 4, line 40; figures 1-4 *	1,2	

			TECHNICAL FIELDS SEARCHED (IPC)
			D05B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 8 December 2005	Examiner Herry-Martin, D
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 L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03 82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 05 02 3417

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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08-12-2005

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