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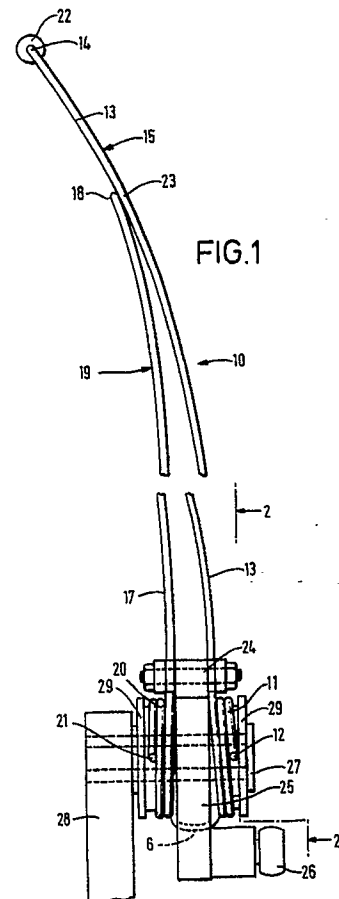
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(54) **Swing arm for a braiding machine.**

(57) A swing arm member (10) for use in a braiding machine for moving the position of a strand of material which extends from a supply spool or reel to the braiding point comprises an arm portion (15, 19; 29, 30; 42, 43; 50, 51) formed by a length of wire which at an outer end is bent back on itself, a mounting member (25, 32, 45, 53) to which the wire arm portion is fixed, and a cam follower (26, 41, 55) provided on the mounting member and which is in contact with a cam.

By forming the swing arm member of wire reduces its inertia and enables the braiding machine to be operated at higher speeds.



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SWING ARM FOR A BRAIDING MACHINE

This invention relates to a swing arm member for use in a braiding machine for moving the position of a strand of material, and to a braiding machine provided with a swing arm member according to the invention.

Rotary braiding machines are known which include a swing arm member which is rocked by a cam for moving the position of a strand of material which extends from a supply spool or reel to the braiding point. Such swing arm members are usually formed of solid metal, such as steel, in order to have the required strength or are formed of composite materials, and this results in the swing arms having high inertia which limits the operating speed of the swing arms and thus the operating speed of the braiding machine. It is also necessary to have to provide resilient loading of the arm members in order to maintain a cam follower provided on the arm members in contact with their operating cam.

The present invention aims to provide a swing arm member which has high strength and low inertia.

According to the present invention there is provided a swing arm member for use in a braiding machine for moving the position of a strand of material which extends from a supply spool or reel to the braiding point, characterised in that the swing arm member comprises an arm portion formed by at least one length of wire which at an outer end is bent back on itself, a mounting member to which the arm portion is fixed, and a cam follower provided on the mounting member which in use of the swing arm member is in contact with a cam.

Preferably resilient means is connected to the mounting member for use in maintaining the cam follower in contact with a said cam.

The swing arm member may comprise a continuous length of wire one end portion of which is coiled to form a first coiled portion, a first portion extending from the first coiled portion and which at an outer end is bent back on itself to form a first arm portion, a second portion located at the end of the bent back portion in the region of the first coiled portion and bent in a direction away from the first coiled portion, a third portion extending from the second portion and parallel with the first portion and which is bent back on itself to form a second arm portion, and a second coiled portion provided at the end of the third portion, said second coiled portion being coaxial with the first coiled portion.

Preferably the swing arm has two arm portions which converge, one arm portion being of less length than the other arm portion and makes contact with the first arm portion.

Preferably one arm portion is secured to the other arm portion at the points of contact therewith.

The bent outer end of the arm portion is preferably provided with a guide roller.

Preferably the arm portions are clamped by a wire clamp member to said mounting member.

The arm portions are preferably curved. The radius of curvature of one arm portion is preferably greater than that of the other arm portion.

Some embodiments of the invention will now be described, by way of examples, with reference to the accompanying drawings, in which:-

Figure 1 is a partial side view of a first embodiment of a swing arm member according to the present invention mounted on a rotatable part of a braiding machine;

Figure 2 is a view taken along the line 2-2 indicated on Figure 1;

Figure 3 is a side elevation of a second embodiment of a swing arm member according to the present invention;

Figure 4 is a view of the swing arm member taken in the direction of the arrow 4 shown in Figure 3;

Figure 5 is a side elevation of a third embodiment of a swing arm member according to the present invention;

Figure 6 is a plan view of the swing arm member shown in Figure 5;

Figure 7 is a side elevation of a fourth embodiment of a swing arm member according to the present invention; and

Figure 8 is a view taken in the direction of arrow 8 indicated in Figure 7.

The swing arm member shown in Figures 1 and 2 is generally indicated at 10 and is formed of a continuous length of wire. The wire is preferably music wire.

One end of the wire is coiled to form a coiled portion 11 which preferably has two complete coils and an outwardly extending tang portion 12 at its end. Extending from the other end of the coiled portion 11 is a portion 13 which at its outer end is bent back on itself at 14. The portion 13 forms an arm portion 15. At the end of the bent back portion of the portion 13 is provided a portion 16 which is bent in a direction away from the coiled portion 11.

A portion 17 extends from the portion 16 and is parallel with the portion 13. The portion 17 is bent back on itself at 18 and forms a second arm portion 19. The end of the portion 17 is coiled to form a second coiled portion 20 which preferably has two complete coils and an outwardly extending tang 21. The second coiled portion 20 is coaxial with the coiled portion 11.

A guide roller or pulley 22 is mounted on the bent portion 14.

The second arm portion 19 makes contact with the arm portion 15 at points 23 and is preferably secured thereto at points 23 by any suitable means, such as by welding.

The arm portions 15 and 19 are bent into a curve. The radius of curvature of the arm portion 19 is greater than that of the arm portion 15.

The swing arm member 10 is clamped by a clamp member 24 to a mounting member 25 which is provided with a cam follower roller 26.

The coiled portions 11 and 20 and the mounting member 25 are mounted on a pintle 27 which extends from a rotatable part 28 provided on a braiding machine.

The tangs 12 and 21 are received in holes, not shown, which are disposed at for example 5° to the horizontal so as to pre-load the coiled portions 11 and 20 in order to maintain the cam follower roller 26 in contact with the operating cam, not shown.

The coiled portions 11 and 20 are mounted on sleeves 29 provided on the pintle 27.

It is possible to provide friction means between the sleeves 29 and the pintle 27 or carrier 28.

The swing arm shown in Figures 3 and 4 consists of two arm portions 29 and 30 each formed of a length of wire which is bent back on itself and terminates in tangs 31 which are received in bores provided in a mounting member 32 which is rotatably mounted on a pintle 33 fixed to a rotatable part 34 of a braiding machine. The arm portions 29, 30 converge towards each other at their outer ends and a guide roller or pulley 35 is mounted on the arm members 29, 30 at their outer end. The arm portions 29, 30 are secured to the mounting member 32 by clamping plates 36. Encircling the mounting member 32 is a coil spring 37 which at one end has a tang 38 received in a bore in the mounting member 32 and which at its outer end has a tang 39 received in a bore provided in a stud 40 secured to the member 34. The mounting member 32 is provided with a cam follower roller 41.

The swing arm shown in Figures 5 and 6 consists of two arm portions 42 and 43 each formed of a length of wire which is bent back on itself and terminates in tangs 44 which are received in bores provided in a mounting member 45 which is rotatably mounted in a manner similar to that of the mounting member 34 described above.

The outer end of the arm portion 42 is provided with a guide roller or pulley 46. The arm portions 42, 43 converge towards each other and are interconnected by the mounting bolt 47 of a guide roller or pulley 48. The arm portions 42, 43 are clamped to the mounting member 45 by clamping plates 49. A coil spring (not shown) is

mounted on the mounting member 45 in a manner similar to the spring 37 described above. The mounting member 45 is provided with a cam follower roller (not shown).

Figures 7 and 8 show a swing arm which consists of two arm portions 50 and 51 each formed of a length of wire which at an outer end is bent back on itself and the lower ends are clamped by clamping members 52 to a mounting member 53. At their outer ends the arm portions 50, 51 support a guide roller or pulley 54.

The mounting member 53 is provided with a cam follower roller 55 and is rotatably mounted on a pintle 56 fixed to a rotatable part 57 of a braiding machine. Secured to the mounting member 53 by a screw 58 is one end of a wire cable 59 which at its other end is provided with a screw-threaded stem 60 on which is mounted a nut member 61 provided with a plate-like member 62 which forms an adjustable abutment for one end of a coiled compression spring 63. Thus the spring 67 acts on the mounting member 53 via the cable 59 to resiliently load the roller 55 into contact with the cam and the swing arm is moved against the resilient loading.

In each of the described embodiments each strand of material provided on a supply reel or spool mounted on the rotating part of the braiding machine below the swing arms and which extends to the braiding point passes over a guide roller or pulley 22, 35, 46, 54 provided on the swing arm and during the operation of the braiding machine is moved by the swing arm so that the strands from the supply reels or spools on the braiding machine pass under and over each other to form the braiding.

By forming the swing arm of wire reduces the mass of material required to form the arm and the inertia of each arm is considerably reduced compared with those formed of solid metal or composite material and thus the braiding machine can be operated at higher speeds.

Where the cam follower roller operates in a curved slot forming the cam surface it is possible to dispense with the resilient loading if the roller has little or no clearance in the slot and does not require any resilient force to maintain it in contact with the cam surface.

Claims

1. A swing arm member for use in a braiding machine for moving the position of a strand of material which extends from a supply spool or reel to the braiding point, characterised in that the swing arm member (10) comprises an arm portion (15, 19; 29, 30; 42, 43; 50, 51) formed by at least

one length of wire which at an outer end is bent back on itself, a mounting member (25, 32, 45, 53) to which the arm portion (15, 19; 29, 30; 42, 43; 50, 51) is fixed, and a cam follower (26, 41, 55) provided on the mounting member (25, 32, 45, 53) which in use of the swing arm member (10) is in contact with a cam. 5

2. A swing arm member as claimed in claim 1, including resilient means (11, 20; 37; 63) connected to the mounting member (25, 32, 45, 53) for use in maintaining the cam follower (26, 41, 55) in contact with a said cam. 10

3. A swing arm member as claimed in claim 2, in which the arm portion (10) comprises a continuous length of wire, one end portion of which is coiled to form a first coiled portion (11), a first portion (13) extending from the first coiled portion (11) and which at an outer end (14) is bent back on itself to form a first arm portion (15), a second portion (16) located at the end of the bent back portion in the region of the first coiled portion (11) and bent in a direction away from the first coiled portion (11), a third portion (17) extending from the second portion (16) and parallel with the first portion (13) and which is bent back on itself to form a second arm portion (19), and a second coiled portion (20) provided at the end of the third portion (17), said second coiled portion (20) being coaxial with the first coiled portion (11). 15 20 25

4. A swing arm member as claimed in any preceding claim, in which the swing arm member (10) has two arm portions (15, 19; 29, 30; 42, 43; 50, 51) which converge towards each other. 30

5. A swing arm member as claimed in claim 4, in which one arm portion (19, 29, 43) is of less length than the other arm portion (15, 30, 42) and makes contact with the said one arm portion (19, 29, 43). 35

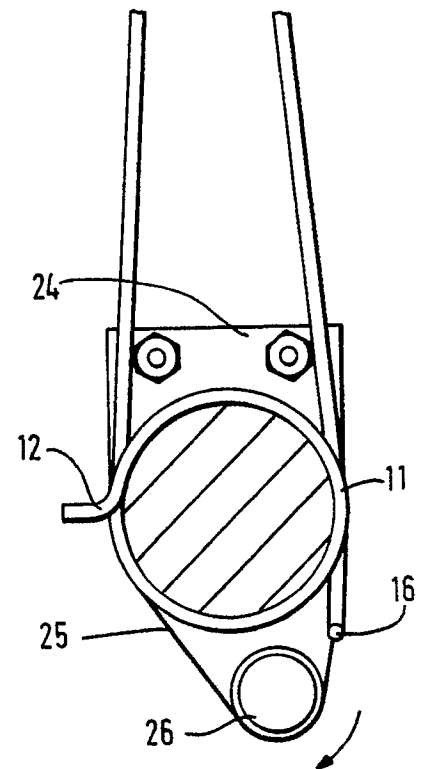
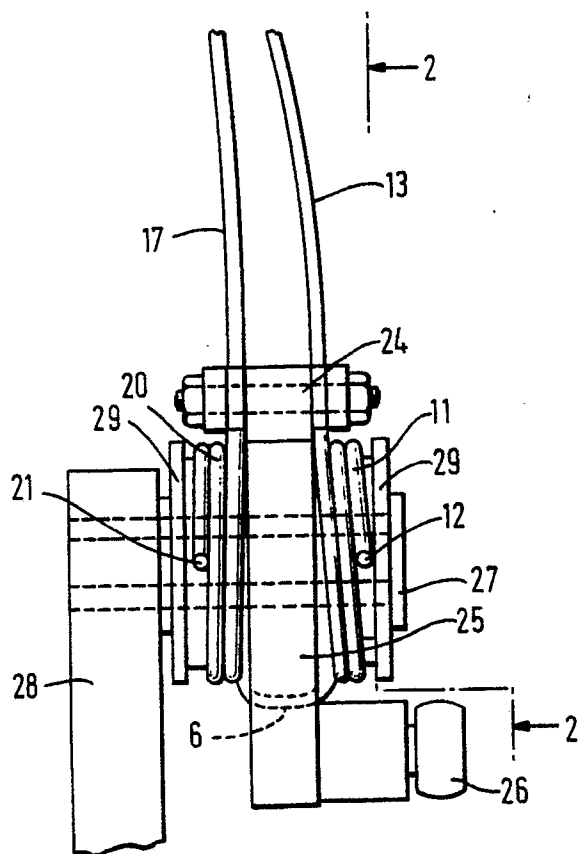
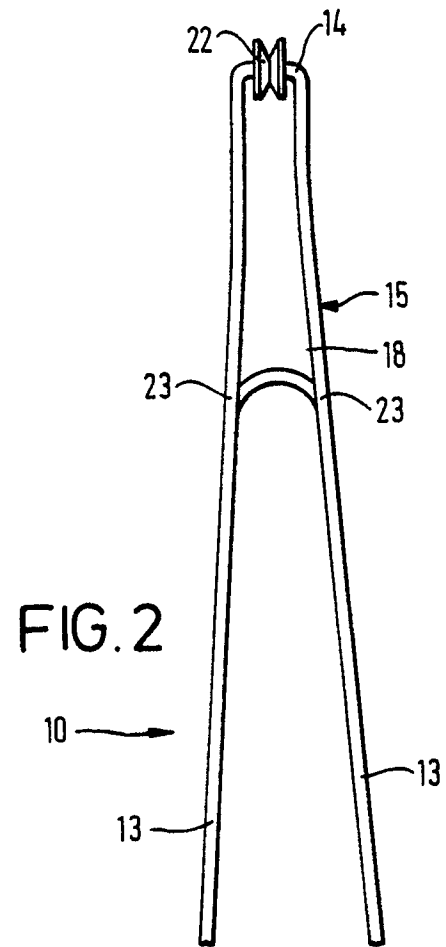
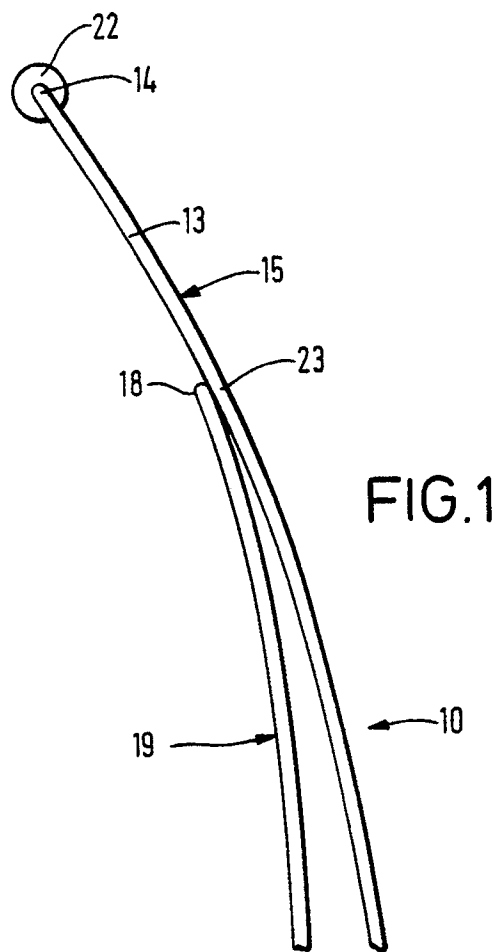
6. A swing arm member as claimed in claim 5, in which said one arm portion (19, 29, 43) is secured to the other arm portion (15, 30, 42) at the points of contact. 40

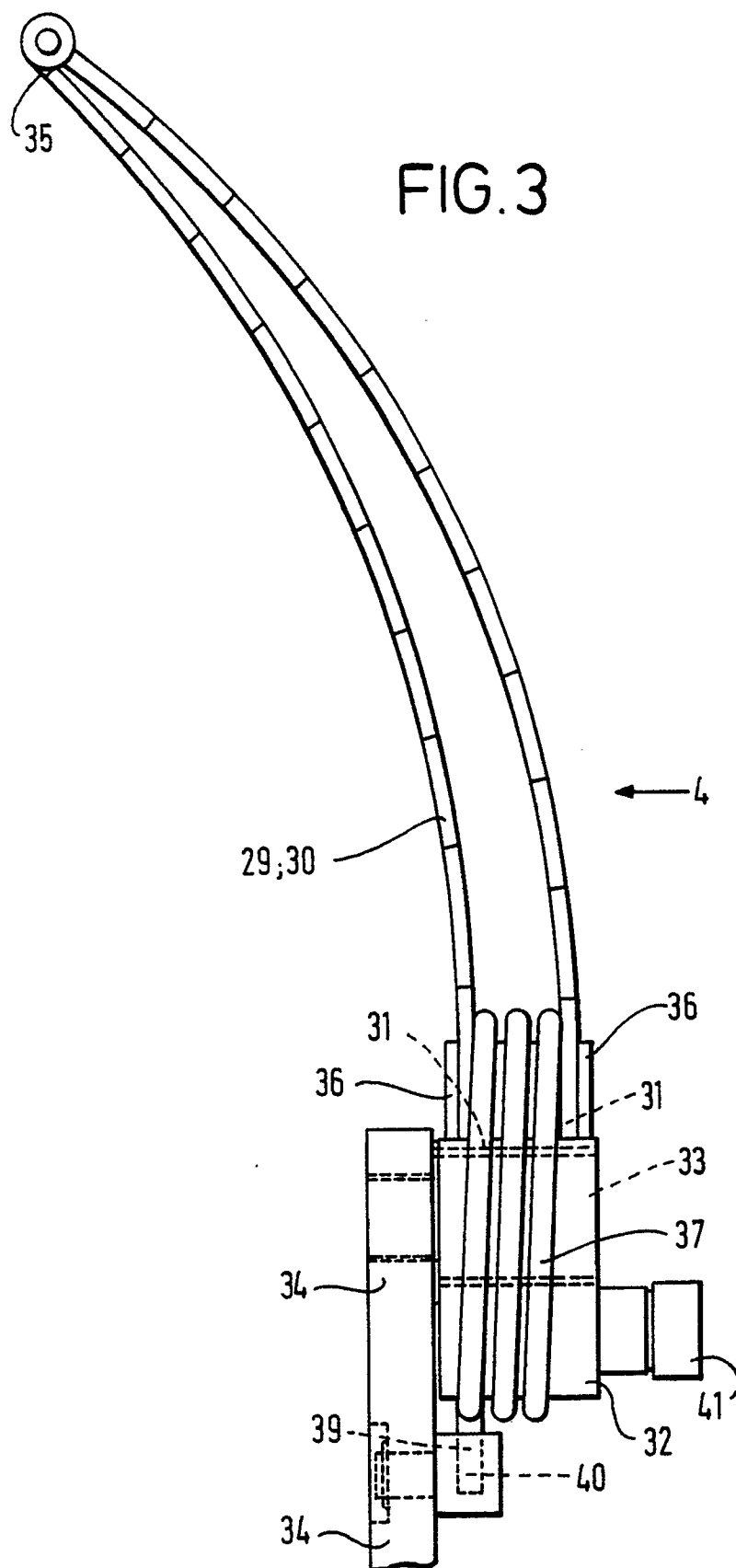
7. A swing arm member as claimed in any preceding claim, in which the bent outer end (14) the arm portion (15, 19; 29, 30; 42, 43; 50, 51) is provided with a guide roller or pulley (22, 35, 46, 54). 45

8. A swing arm member as claimed in any preceding claim, in which the arm portions (15, 19; 29, 30; 42, 43; 50, 51) are clamped by a wire clamp member (24, 36, 49, 52) to the mounting member (25, 32, 45, 53). 50

9. A swing arm member as claimed in any one of claims 4 to 6, in which the arm portions are curved.

10. A swing arm member as claimed in claim 2, in which the resilient means (63) comprises a coil spring (63) which acts on the mounting member (53) via a cable (59). 55





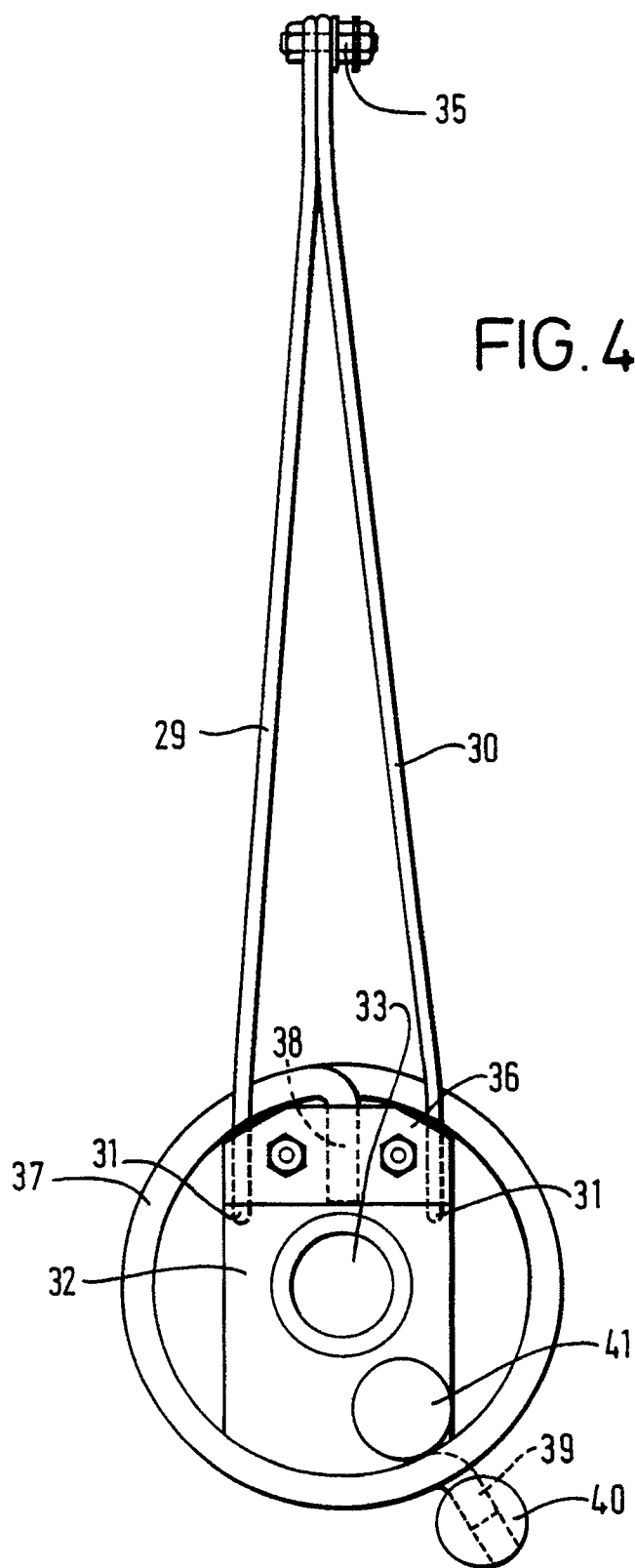


FIG. 5

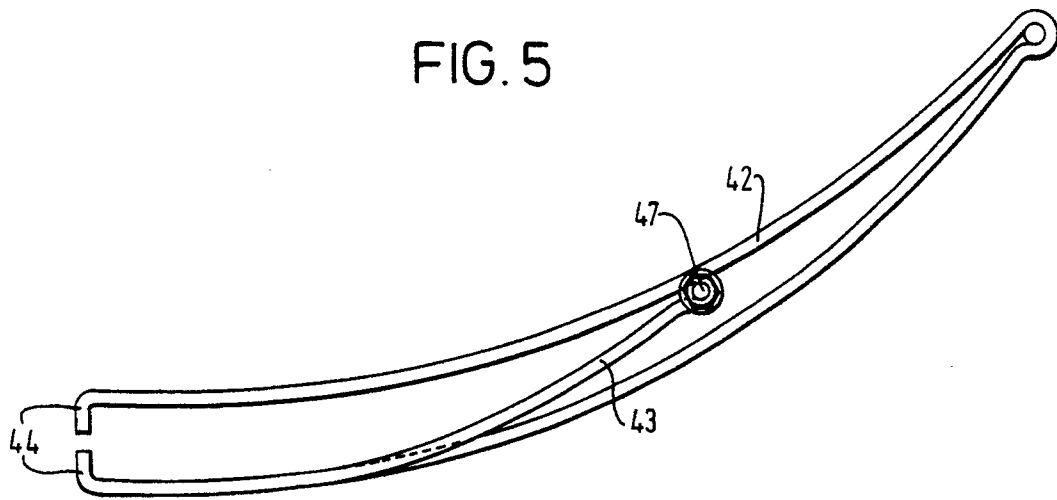
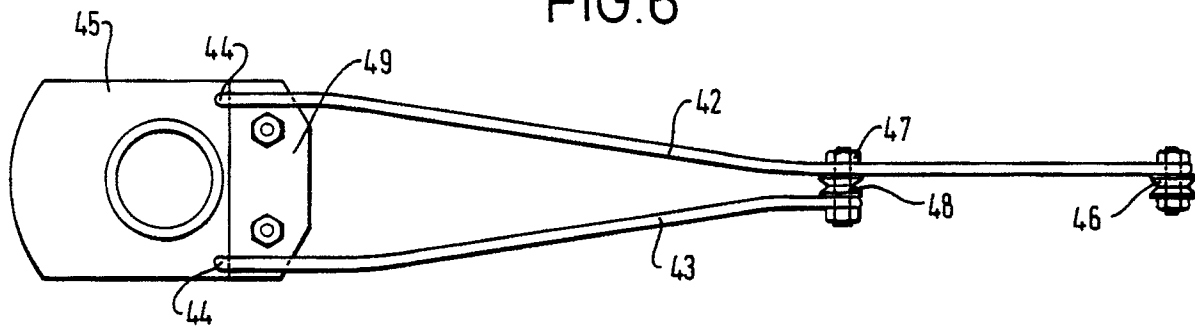


FIG. 6



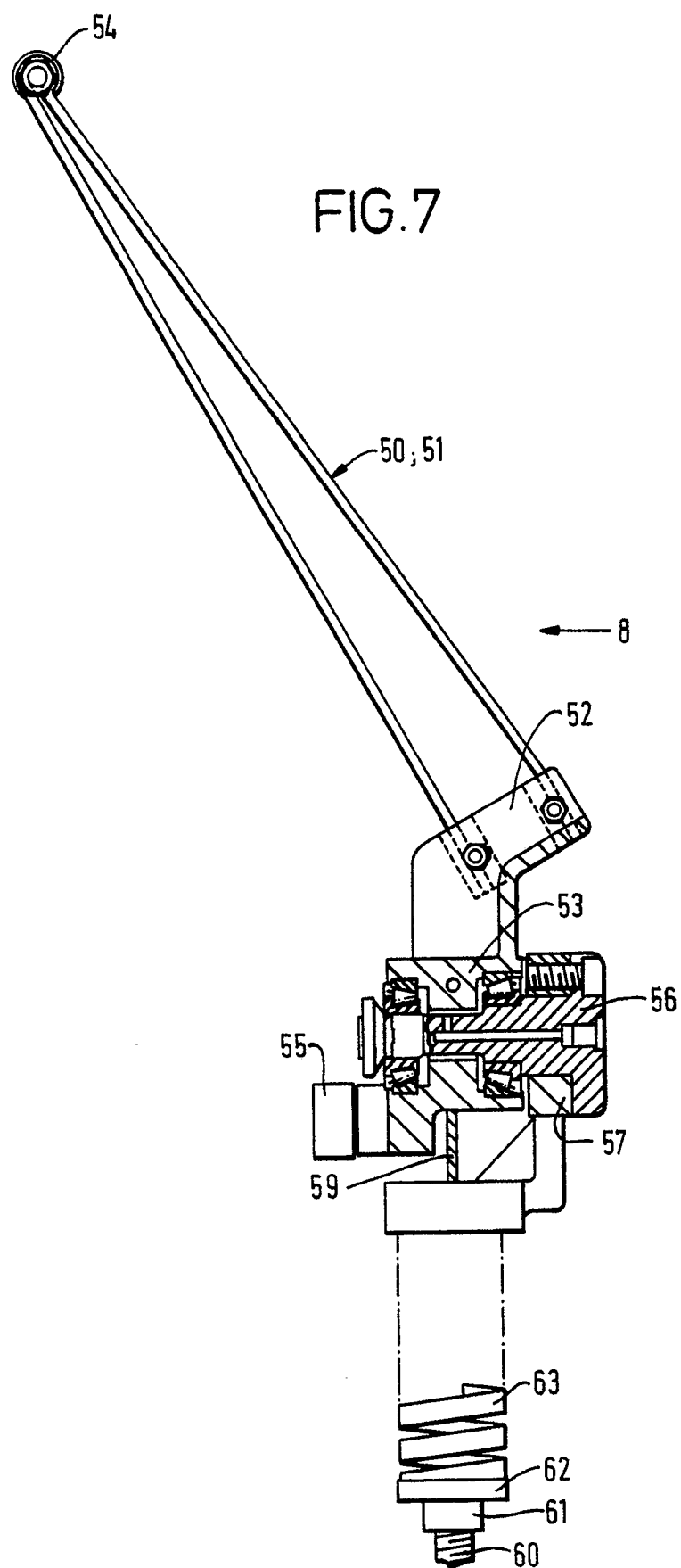
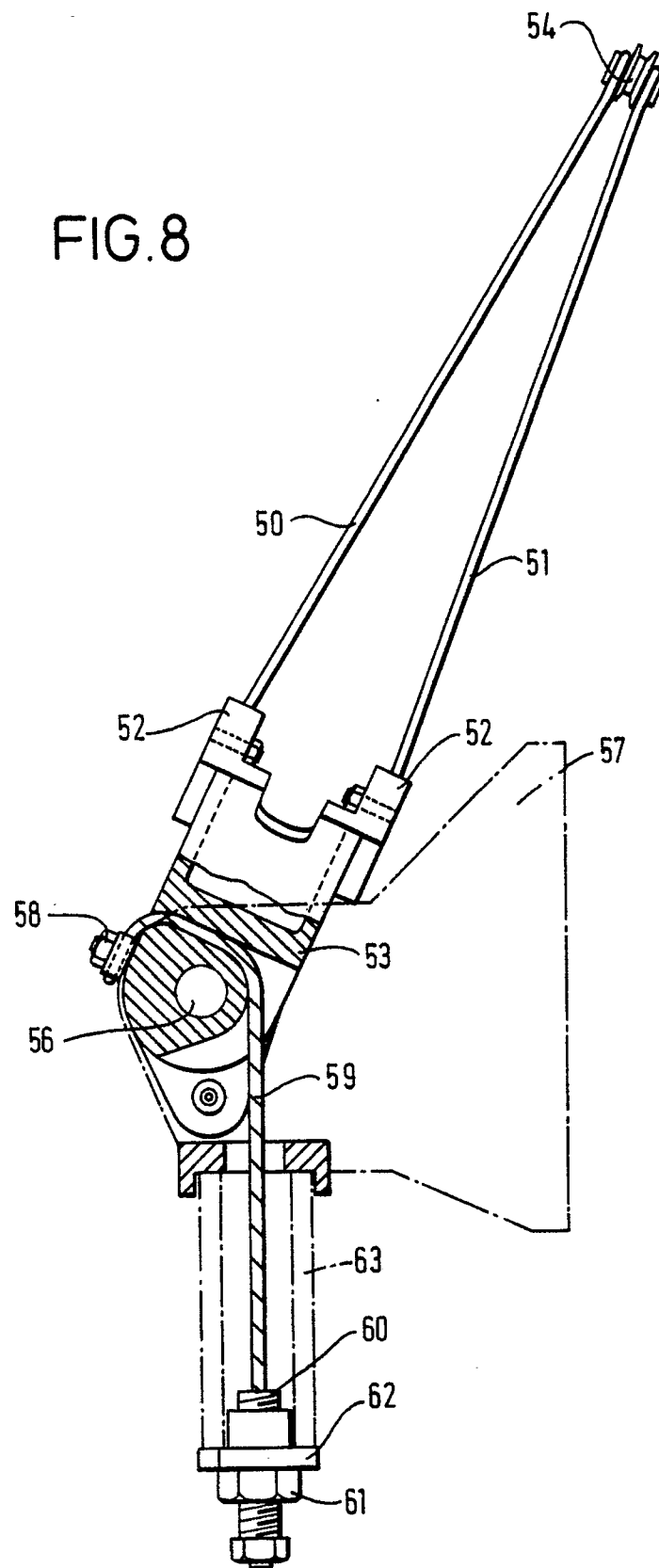


FIG.8





DOCUMENTS CONSIDERED TO BE RELEVANT			EP 90307836.8
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	<u>US - A - 1 386 071</u> (PETERSEN) * Fig. 2; page 2, lines 15-36 *	1	D 04 C 3/42
A	-- <u>US - A - 1 689 389</u> (HORN) * Totality *	1	
A	-- <u>US - A - 1 105 452</u> (PETERSEN) * Fig. 5 * -----	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			D 04 C 3/00
The present search report has been drawn up for all claims			
Place of search VIENNA		Date of completion of the search 16-11-1990	Examiner BAUMANN
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			