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(54) Device for stringing rackets.

(57) Device (11) for stringing rackets (6), whereby the tractive power to be exerted on the string is exactly determined previously and continuously exerted on the string, in such a manner that this tractive power is being maintained during the whole operation.

This device (11) comprises two levers (12,13) which are freely pivotably mounted with respect to a common support (16); on the free end of one of these levers (12,13) means (22) wherein a string of a racket (6) can be fixed; at one end of the second lever (13) means allowing it to pivot to and fro about its pivoting centre (15); between the aforesaid levers (12-13), elastic means allowing to transmit the to and fro motion of the aforesaid second lever (13) to the first lever (12); adjustably fixed with respect to one end of the aforesaid elastic means, a microswitch and, firmly fixed to the second end of the aforesaid elastic means, means constituting a stop that can cooperate with the aforesaid microswitch.

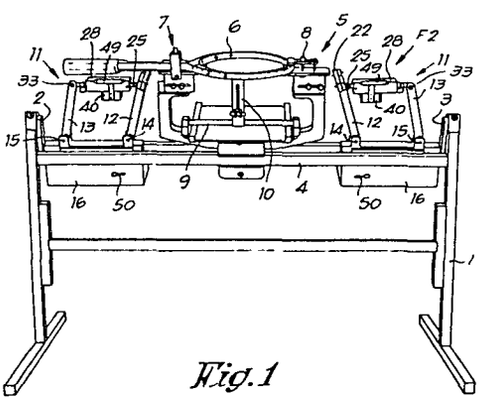

Fig.1

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Device for stringing rackets

The present invention relates to a device for stringing rackets, more especially tennis rackets.

More especially still, this invention relates to a device for stringing rackets, more especially tennis rackets, the tractive power to be exerted on the string being accurately pre-determined and continuously applied to the string, in such a way this tractive power will be maintained during the whole operation, and this device being such that, should the aforesaid tractive power decrease due to any external cause, for instance through elongation of the material, the device will automatically be adjusted again to the aforesaid pre-determined tractive power.

It is clear that in this manner the tractive power will correspond to the pre-determined value at all times, independently of the elongation of the material used, of a less effective clamping of the string, of too high a slipperiness factor, etc.

Furthermore, the device according to the invention is of a very simple execution, whilst the adjustment of the desired tractive power can be carried out in a very simple way and can be appropriately read.

Another object of the device according to the invention is that it is fixed on a frame, on which is also fixed the frame

that carries the rackets to be stringed, that between the device according to the invention and frame carrying the racket to be stringed a certain relative motion is possible, which is very advantageous in case of repairs, because it offers the possibility of using short pieces of catgut.

Another object still of the invention is that the device is driven by electricity, whereby the work is carried out nearly noiselessly, which is not the case for racket stringing devices using as a driving means an air compressor. One will preferably use a low voltage, in order to obtain a very high degree of safety.

Finally, the device according to the invention is very reliable because of its simplicity, resulting in its maintainance being limited to a strict minimum.

The device according to the invention that offers the aforesaid and other advantages, mainly comprises two levers which are freely pivotably mounted with respect to a common support; on the free end of one of these levers means wherein a string of a racket can be fixed; at one end of the second lever means allowing it to pivot to and fro about its pivoting centre; between the aforesaid levers, elastic means allowing to transmit the to and fro motion of the aforesaid second lever to the first lever; adjustably fixed with respect to one end of the aforesaid elastic means, a microswitch and, firmly fixed to the second end of the aforesaid elastic means, means constituting a stop that can cooperate with the aforesaid microswitch.

In order better to show the characteristics of the invention, there is described hereinafter, as an example without any limiting character, a preferred embodiment, reference being made to the attached drawings, wherein :

figure 1 shows in perspective a front view of a machine for stringing rackets in which means according to the in-

vention are being used;
figure 2 shows to a larger scale the device, strictly speaking, according to the invention, more in particular the part which is indicated by F2 in figure 1;
figure 3 is a view according to line III-III in figure 2;
figure 4 is a view that is similar to the one of figure 2, but the device according to the invention being in working position;
figure 5 shows to a greater scale a section according to line V-V in figure 3;
figure 6 shows a section according to line VI-VI in figure 5.

In figure 1 there is shown a machine for stringing rackets, which mainly comprises a base frame 1 wherein, by means of pivots, respectively 2 and 3, a second frame 4 is suspended so that it can pivot to and fro and that it can be appropriately fixed in any desired position, there being movably and pivotably mounted on this second frame a frame 5, wherein the rackets 6 to be strung can appropriately be fixed, for instance by clamping means, respectively 7 and 8, and there being provided, on this frame 5, a guide 9 on which it is possible to slide a clamp 10. On the aforesaid frame 4 are furthermore provided according to the invention two devices 11, which are slidable in relation to the aforesaid frame 5 of the racket and can be fixed on the frame 4 in any relative position in relation to this frame 5.

Each device 11 mainly comprises two levers, respectively 12 and 13, which, by means of pivots, respectively 14 and 15, are freely pivotably fixed in relation to a housing 16, which rests and is fixed on the frame 4, the lever 13, beyound its pivoting point 15, carrying a toothed sector 17 which is continuously in mesh with a pinion 18, provided on the shaft 19 of an electric motor 20.

The free end of the lever 12 is provided with clamping means,

which are known in themselves, for the string 21 to be put under tension, which in this case consist in a transversal lath 22, on which are provided small movable pressing parts, respectively 23 and 24.

As more particularly shown in figure 5, with the lever 12, by means of a pivot 25, there is connected a rod 26, which itself is fixed to a housing 28 by means of a pin or similar part 27, a spring 30 being connected with the profiled end 29, located in the housing 28, of the rod 26. At its other end this spring is connected with the profiled end 31 of a rod 32, which is pivotably connected by means of a pivot 33 with the free end of the lever 13, on the one hand, whereas this rod 32, by means of a pin or similar part 34, on the other hand, is connected with a guide 35 for the aforesaid spring, this guide being freely slidably mounted in the aforesaid housing 28 and being provided with an appropriate projection 36 which, during the relative displacement of the guide 35, is capable of moving in relation to the housing 28 in a groove 37 which is provided in the housing 28.

To the aforesaid housing 28, by means of dovetail projections, respectively 38 and 39, there is slidably mounted the housing 40 of a microswitch 41, the contact component 42 of which, in this case in the shape of a small wheel, is placed in the groove 37 and, consequently, can come into contact with the aforesaid projection 36 of the guide 35. Furthermore, the housing 40 of the aforesaid microswitch is provided with a projection 43 in which there is provided a threaded hole 44 cooperating with a threaded rod 45, which is rotatably but axially unmovably mounted in a projection 46 provided for this purpose on the aforesaid housing 28, whilst it is possible to turn this threaded rod 45 by means of an appropriate control button 47.

The use and working of the device according to the invention are very simple.

In the embodiment as shown in the attached figures, it suffices to previously adjust on the devices 11 the tractive power which it is desired to exert on the strings. For this purpose, by means of the control button 47, one turns the threaded rod 45 in order to obtain that the housing 40 moves in relation to the housing 28, until a mark 48 on a projection of the housing 40 comes in front of a certain value of a graduated scale 49 which is provided on the housing 28. One obtains in this way that, before starting the device, a definitive distance is set between the aforesaid projection 36 of the guide 35 and the contact point 42 of the microswitch 41.

It then suffices to fix a racket 6 in a frame 5, by means of the clamping devices 7 and 8, after having previously, depending for instance on the dimensions of the racket, fixed the devices 11 at an appropriate distance in relation to the frame 5, which is also assembled with the frame 4. After the aforesaid adjustments have been carried out, one will install in the racket 6 a string, which one will seize in a known manner, on the one hand, by means of a separate clamp and, on the other hand, by means of the clamp 10 alternately, after a string has been installed in the racket 6, and one will put this string under tension through alternately using one of the devices 11 for exerting a traction on the string.

For this purpose, it is sufficient to fix the string in a clamping device 22, 23 or 22, 24 and to close the electric circuit of the motor 20, which may, for instance, be done by actuating a switch 50. Herethrough, the pinion 18 will drive the toothed sector 17, wherethrough the lever 13 will pivot on the hinge point 15 and the spring 30 will become stretched, whilst at the same time the projection 36 of the guide 35 will become displaced towards the contact component 42 of the switch 41. In this way, the string will be tensioned, exactly till the microswitch 41 becomes pushed in, whereby the current to the motor 20 is being cut. At this moment, the string 21 is tensioned as initially wanted, in other words as determined by the

adjustment of the aforesaid microswitch 41.

Should the tension decrease for any reason in the string 21 at this moment, for instance through further elongation of the material from which the string 21 is made, one will obtain that the lever 12 of the racket moves away, whereby the contact point 22 also comes clear of the projection 36, resulting in the motor 20 receiving current again and the lever 13 becoming pulled back farther away around point 15, in order to restore the desired tractive power in the string 21.

It is clear that in this manner one obtains a device allowing to adjust a desired tractive power and to exert it continuously on the string of the racket, whilst this tension is continuously maintained and automatically restored to the adjusted value if, due to an external cause as elongation, imperfect clamping of the string or similar causes, the tension in the string should decrease.

In the attached figure 1, two suchlike devices 11 are shown, so that the racket 6 can be maintained in a definitive position, but of course nothing prevents to achieve a single device according to the invention, in which only one device 11 is used.

The present invention is by no means limited to the embodiment which has been described as an example and shown in the attached drawings, but such a device can be built in various shapes and with various dimensions without going outside the scope of the present invention.

Claims.

1.- Device for stringing rackets, characterized in that it mainly comprises two levers (12-13) which are freely pivotably mounted with respect to a common support (16); on the free end of one of these levers means (22-23-24) wherein a string (21) of a racket (6) can be fixed, at one end of the second lever (13) means (17-18-19-20) allowing it to pivot to and fro about its pivoting centre; between the aforesaid levers (12-13), elastic means (30) allowing to transmit the to and fro motion of the aforesaid second lever (13) to the first lever (12); adjustably fixed with respect to one end of the aforesaid elastic means (30), a microswitch (41) and, firmly fixed to the second end of the aforesaid elastic means (30), means (36) constituting a stop that can cooperate with the aforesaid microswitch (41).

2.- Device according to claim 1, characterized in that the aforesaid means for driving the second lever (13) are constituted by an extension of this lever (13) below its pivoting point (15), a toothed sector (17) being provided at the end of this extension, which toothed sector is in constant mesh with a pinion (18) provided on the driving shaft (19) of an electric motor (20).

3.- Device according to claim 1, characterized in that the pivoting points (14-15) of the aforesaid levers (12-13) are located on a same level.

4.- Device according to claim 1, characterized in that, nearby their ends, the aforesaid levers (12-13) are each connected by means of a pivot pin (25-35), with a rod (26-32), the ends facing one another of these rods (26-32) being provided for fixing to each rod end one end of a common spring (30).

5.- Device according to one of the preceding claims, characterized in that to the aforesaid rod (26), which is freely rotatably fixed on the lever (12) which carries the clamping means (22-23-24) for the string (21), there is fixed a housing (28) wherein a guide for the aforesaid spring is freely slidably

mounted, this guide (35) being fixed to the rod (32) which is freely pivotably fixed in the aforesaid second lever (13) and being provided with a projection (36) which can cooperate with a microswitch (41) that is provided on the aforesaid housing (28).

6.- Device according to claim 5, characterized in that in the aforesaid housing (28), along the major part of its length, a groove (37) is provided, wherein the aforesaid projection (36) can move, whilst the contact component (42) of the aforesaid microswitch (41) is also mounted in this groove (37).

7.- Device according to claim 6, characterized in that the aforesaid microswitch (41) is mounted in a housing (40) which is slidable in the longitudinal direction of the first mentioned housing (28).

8.- Device according to claim 7, characterized in that the housing (40) in which the aforesaid microswitch (41) is housed is provided with a projection (43) wherein there is a threaded hole (44), a threaded rod (45) which is freely rotatably but not axially movably mounted in a projection (46) of the first mentioned housing (28), cooperating with this threaded hole (44) and this threaded rod (45) being preferably provided with a turning button (47).

9.- Device according to one of the preceding claims, characterized in that on the first mentioned housing (28) there is provided a graduated scale (49), whereas on the housing (40) wherein the aforesaid microswitch (41) is mounted there is provided a projection carrying a mark (48), which can be displaced in front of the aforesaid graduated scale (49).

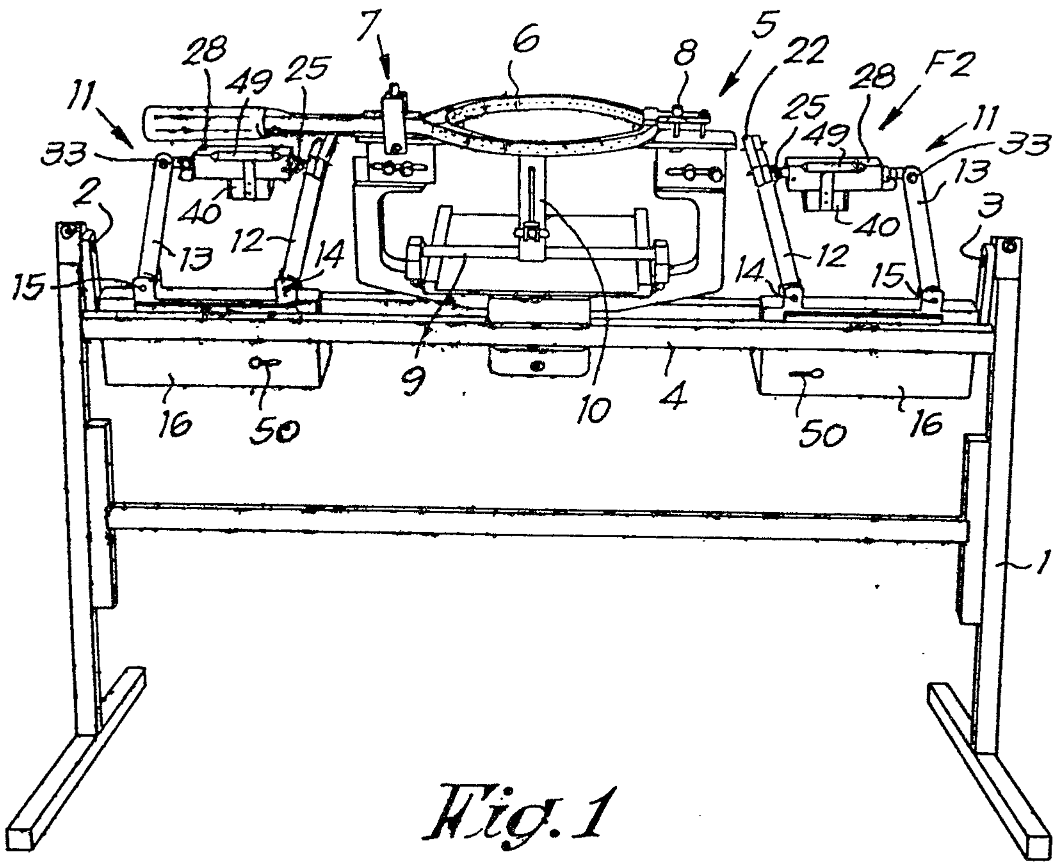
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Fig.1

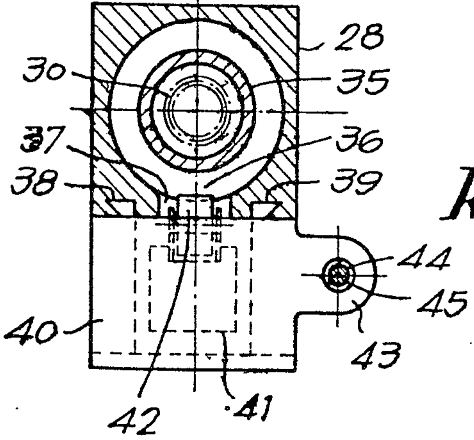
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Fig.6

Fig. 3

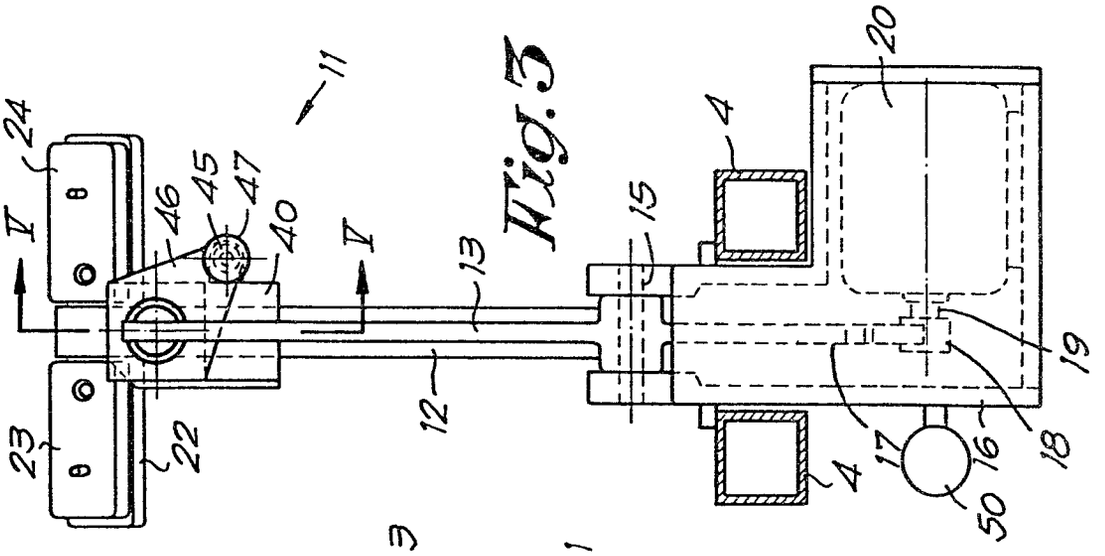
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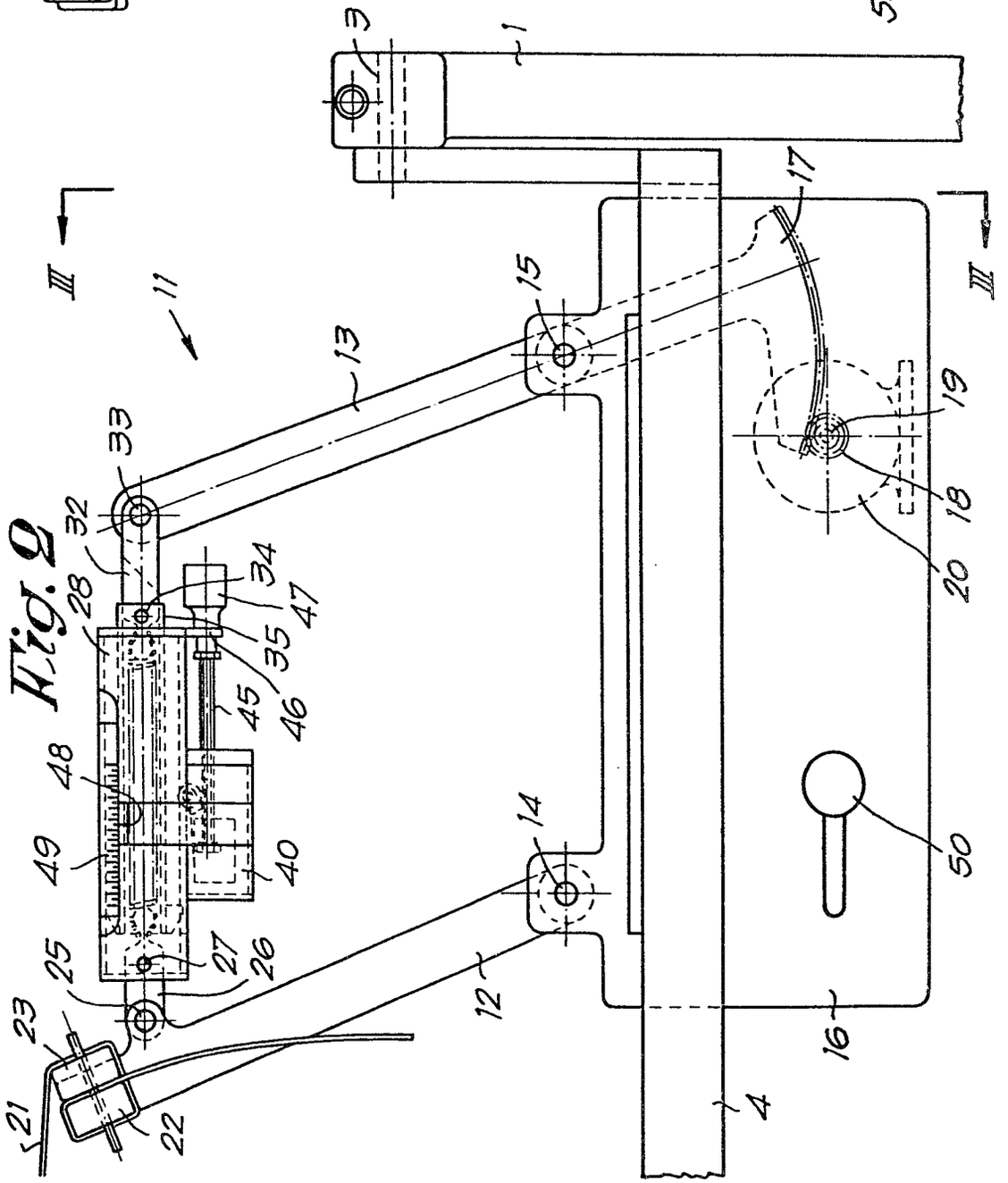
Fig. 2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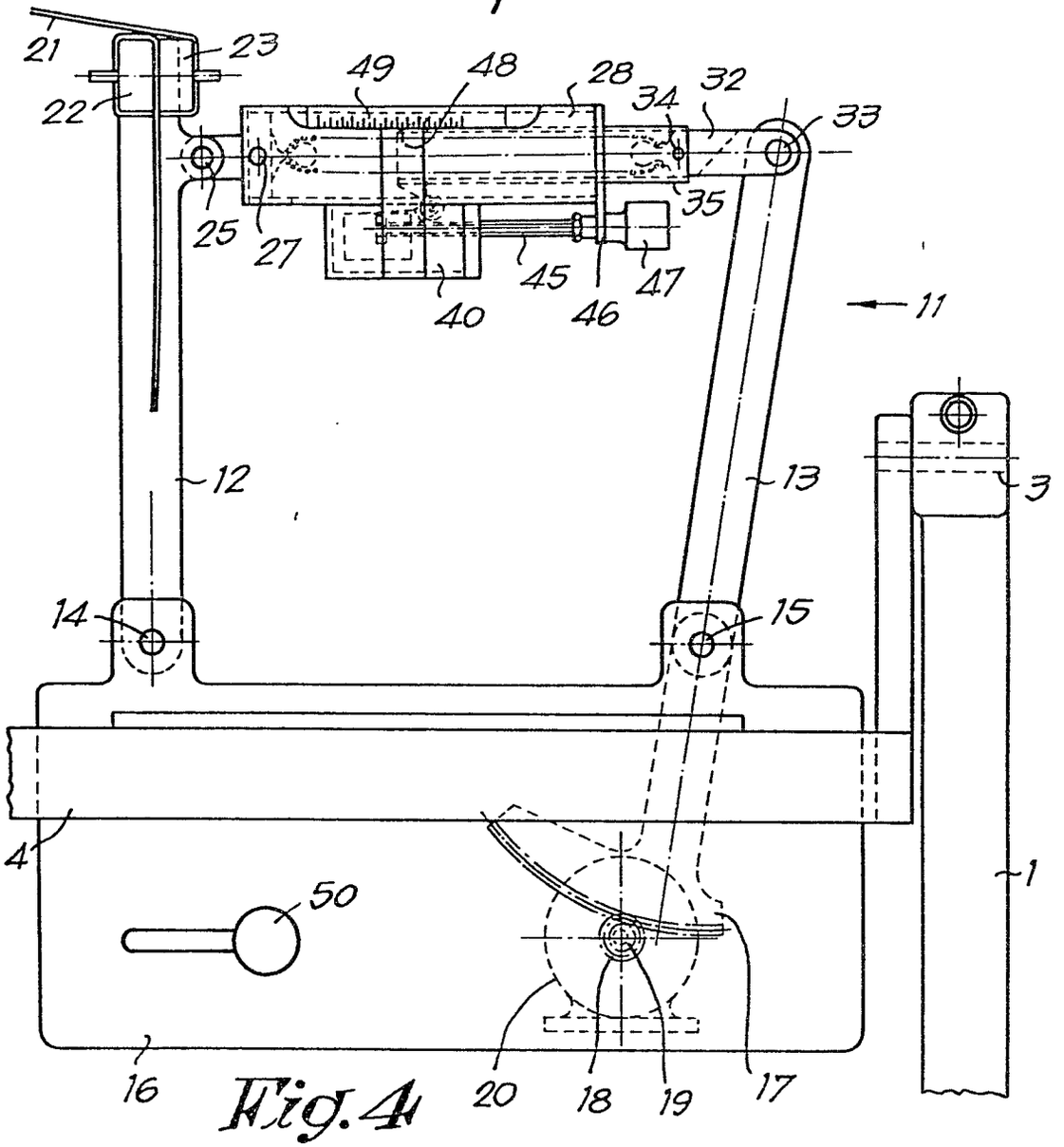
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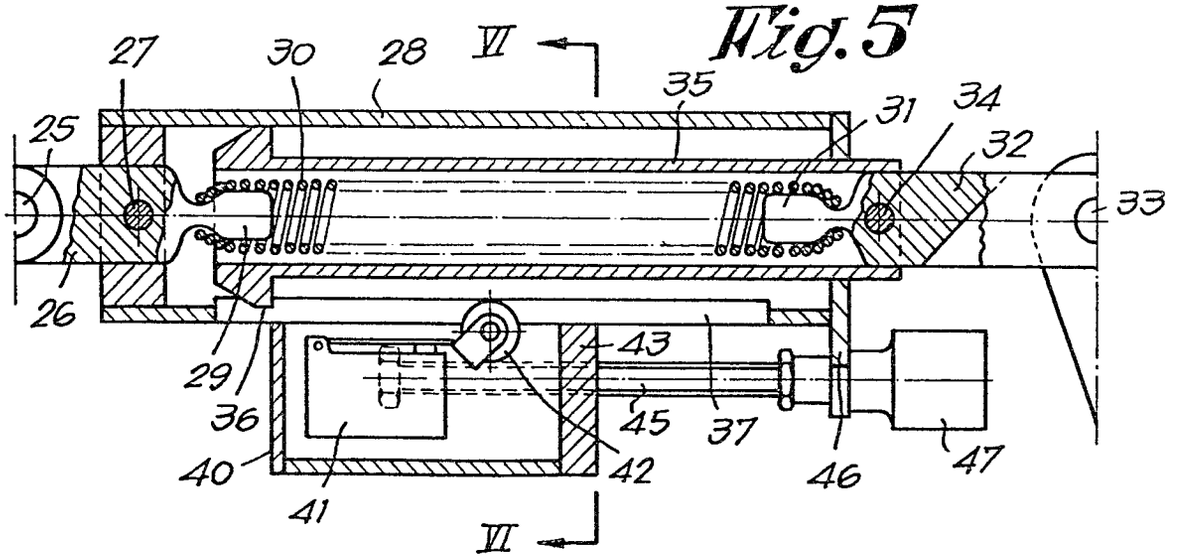
Fig. 4

Fig. 5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European Patent Office

EUROPEAN SEARCH REPORT

Application number

EP 80 20 0735.1

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
P,X	BE - A - 878 579 (FISCHER INDUSTRIES) * claims 1 to 9; fig. 1 to 6 *	1-9
	US - A - 3 441 275 (F.W. HELD) * claim 1; column 4, line 25 to column 5, line 62; fig. 2, 3, 11, position 20 *	1
	DE - C - 622 593 (S.H. SIEFF) * fig. 1, position 27 *	1
	BE - A - 744 769 (A. DE MEYER) * page 3; fig. 1, position 5 *	1
	US - A - 4 156 525 (P.E. PARNELL) * abstract; columns 5 to 7; fig. 1, 8, 9, positions 28, 114 *	1
A	US - A - 3 918 713 (B. KAMINSTEIN) * claim 1; abstract; column 3, line 55 to column 5, line 22; fig. 1, 7 *	
A	US - A - 3 988 022 (T.P. HALBROOK) * fig. 1 *	

CLASSIFICATION OF THE APPLICATION (Int Cl ³)

A 63 B 51/14

TECHNICAL FIELDS SEARCHED (Int. Cl.³)

A 63 B 51/14
A 63 B 51/16

CATEGORY OF CITED DOCUMENTS

X: particularly relevant
A: technological background
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T: theory or principle underlying the invention
E: conflicting application
D: document cited in the application
L: citation for other reasons

&: member of the same patent family, corresponding document

X The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Berlin	12-12-1980	DROPMANN