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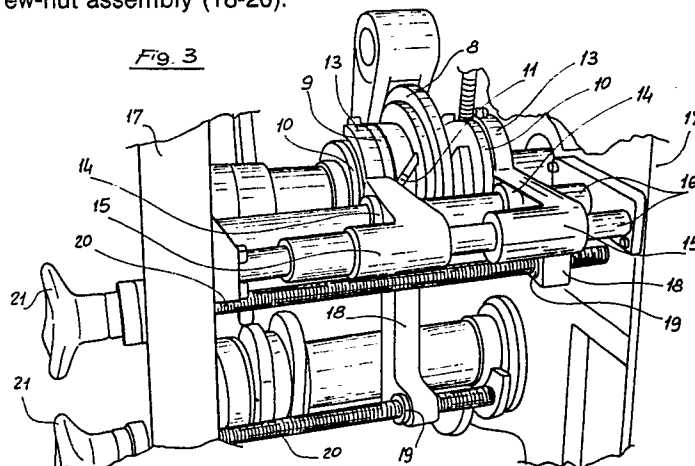
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EUROPEAN PATENT APPLICATION

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14/A
I-20122 Milano(IT)(54) **Improvements in and/or relating to machines for making coil springs.**

(57) The improvements are specifically related to the mechanical assembly for setting the start and end of the coil turns, which assembly comprises a shaft (1) thereon there is keyed a coaxial annular element (2) which slidingly supports, on its two sides (3) and with diametrically opposite arrangements, corresponding cam holders (6) provided with a circumferential slot (4).

Through these slots a plate (9) can slide, having a rectilinear ridge (11) and cantilever wise formed at the perimeter of a collar (10) rigidly coupled with the shaft, the ridge engaging a corresponding hollow of a related cam (8), and the plate bidirectional translation being controlled by a screw-nut assembly (18-20).



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IMPROVEMENTS IN AND/OR RELATING TO MACHINES FOR MAKING COIL SPRINGS

BACKGROUND OF THE INVENTION

The present invention relates to improvements in and/or relating to machines for making coil springs.

As is known, in compression coil springs it is necessary that the coil end portions are so arranged and designed as to define planes perpendicular to the coil spring axis.

This requirement is presently met by providing, at the start and end of the coil spring at least a turn of zero pitch.

On the other hand, because of constructional or use requirements, it may be indispensable to either increase or decrease the length of the wire portions forming the mentioned starting and ending parts of the coil spring.

This is presently achieved by suitably changing the mutual positions of the two cams, specifically provided for defining or setting the pitch distance between the coil spring turns, with respect to the rotary shaft thereon said cams are mounted.

In conventional coil spring making machines, the mentioned cams, substantially consisting of circular ring sectors, are coupled firmly to their shaft by means of longitudinal slots therein there are engaged small bolt elements supported by corresponding lugs radially extending of the shaft.

This coupling shaft-cam system affords the possibility of adjusting, in a comparatively easy manner, the mutual position of the two cams with respect to their supporting shaft.

However, this adjusting operation can be exclusively performed with the machine in a stop or not actuated condition; thus the adjusting time will be very long and expensive.

SUMMARY OF THE INVENTION

Accordingly, the present invention sets out to overcome the above mentioned drawbacks, by providing a mechanical assembly to be applied to coil spring making machines, which affords the possibility of easily and quickly changing the arrangement of the cams with respect to the rotary shaft supporting said cams, with the machine in operation.

Within the scope of the above mentioned aim, a main object of the present invention is to provide such a mechanical assembly which changes the cam arrangement in a continuous way, either affecting a single cam, or affecting both the cams.

Another object of the present invention is to provide such an assembly which is very simple construction wise and very reliable in operation.

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 mechanical assembly, for application to coil spring making machines, characterized in that said assembly essentially comprises a supporting shaft thereon there is keyed a coaxial annular element slidably supporting, at its two sides and with a diametrically opposite arrangement, corresponding cam holders, provided with a respective circumferential slot, through said slots a plate being effective to slide, said plate having a linear ridge and being formed cantilever wise at the perimeter of a collar rigidly coupled to said shaft, said ridge engaging with a corresponding hollow of a related cam, said plate bidirectional displacement being controlled by a driving screw-nut assembly.

BRIEF DESCRIPTION OF THE DRAWINGS

Further characteristics and advantages of the mechanical assembly specifically provided for application to coil spring making machines according to the present invention, will become more apparent from the following detailed description of a preferred embodiment thereof, which is illustrated, by way of an indicative but not limitative example, in the figures of the accompanying drawings, where:

figure 1 is a partially sectioned view illustrating the mechanical assembly according to the invention;

figure 2 is a side view illustrating this assembly;

figure 3 is a side perspective view illustrating this assembly;

and figures 4 and 5 are two perspective view taken from the front of the assembly, and specifically showing collar elements arranged at different positions with respect to a rotary shaft.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to the figures of the accompanying drawings, the mechanical assembly for application to coil spring making machines according

to the present invention comprises a driven shaft 1, driven with a suitable rotary movement, through driving and transmission means of a substantially conventional type.

On this shaft there is keyed a coaxial annular element 2, on the two flat sides 3 of which there are provided corresponding slots 4, coaxial with respect to said shaft and slidably housing one end 5, right angle bent, of a plate like element 6, of substantially circular ring segment shape.

The plate like element 6, in turn, is provided with a circle arch circumferential slot 7 and removably supports an indexable cam 8, of conventional profile.

Through said slot a plate 9 can slide, said plate being cantilever formed at the perimeter of a collar 10 which is rigidly coupled to said shaft 1.

As shown, the mentioned plate is provided with a linear ridge 11, essentially consisting of an elongated helicoidal portion, which engages in a corresponding hollow 12 formed in a corresponding cam.

In said collars 10 engage corresponding fork members 13 which are slidably coupled, through middle tubular elements 14 and end elements 15, on corresponding fixed horizontal small shafts 16 supported between the shoulders 17 of the machine.

Radially of these end elements there are formed corresponding lugs 18 comprising corresponding screw nuts 19 which are helically coupled with screws 20 rotatably supported by one of the shoulders of the machine.

On the end portions of said screws, outside of the supporting shoulders, there is provided a small handwheel or knob or the like 21 for an easy manual rotation either in a direction or in the other.

It should be apparent that, by rotating the mentioned screws, even if the machine is in operation, it will be possible to continuously modify the mutual position of the cams 8 with respect to the driving shaft 1.

While the invention has been disclosed and illustrated with reference to a preferred embodiment thereof, it should be apparent that the disclosed embodiment is susceptible to several modifications and variations all of which will come within the spirit and scope of the accompanying claims.

Claims

1- A mechanical assembly for application to coil spring making machines, characterized in that said assembly essentially comprises a supporting shaft thereon there is keyed a coaxial annular element slidably supporting, at its two sides and with a diametrically opposite arrange-

ment, corresponding cam holders, provided with a respective circumferential slot, through said slots a plate being effective to slide, said plate having a linear ridge and being formed cantilever wise at the perimeter of a collar rigidly coupled to said shaft, said ridge engaging with a corresponding hollow of a related cam, said plate bidirectional displacement being controlled by a driving screw-nut assembly.

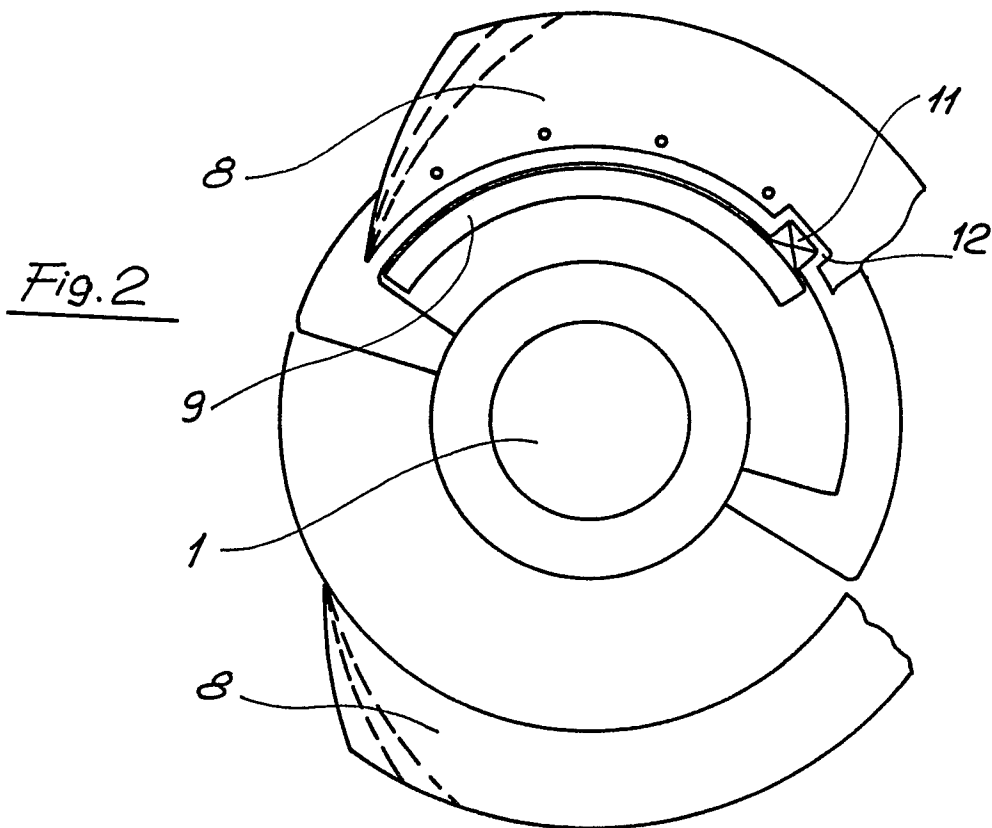
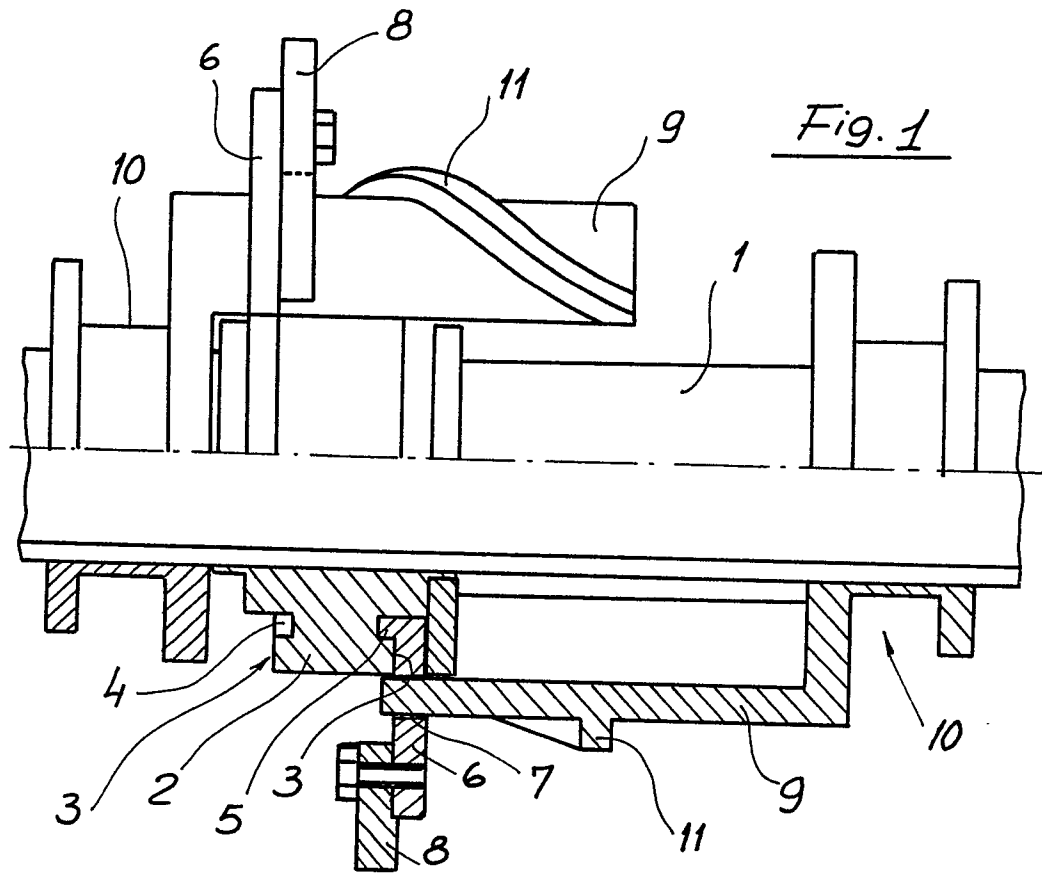
2- A mechanical assembly according to claim 1, characterized in that at the two sides of said annular element keyed on said shaft there are formed corresponding slots coaxial with respect to said shaft and slidably housing one right angle bent end of a circular ring segment plate element.

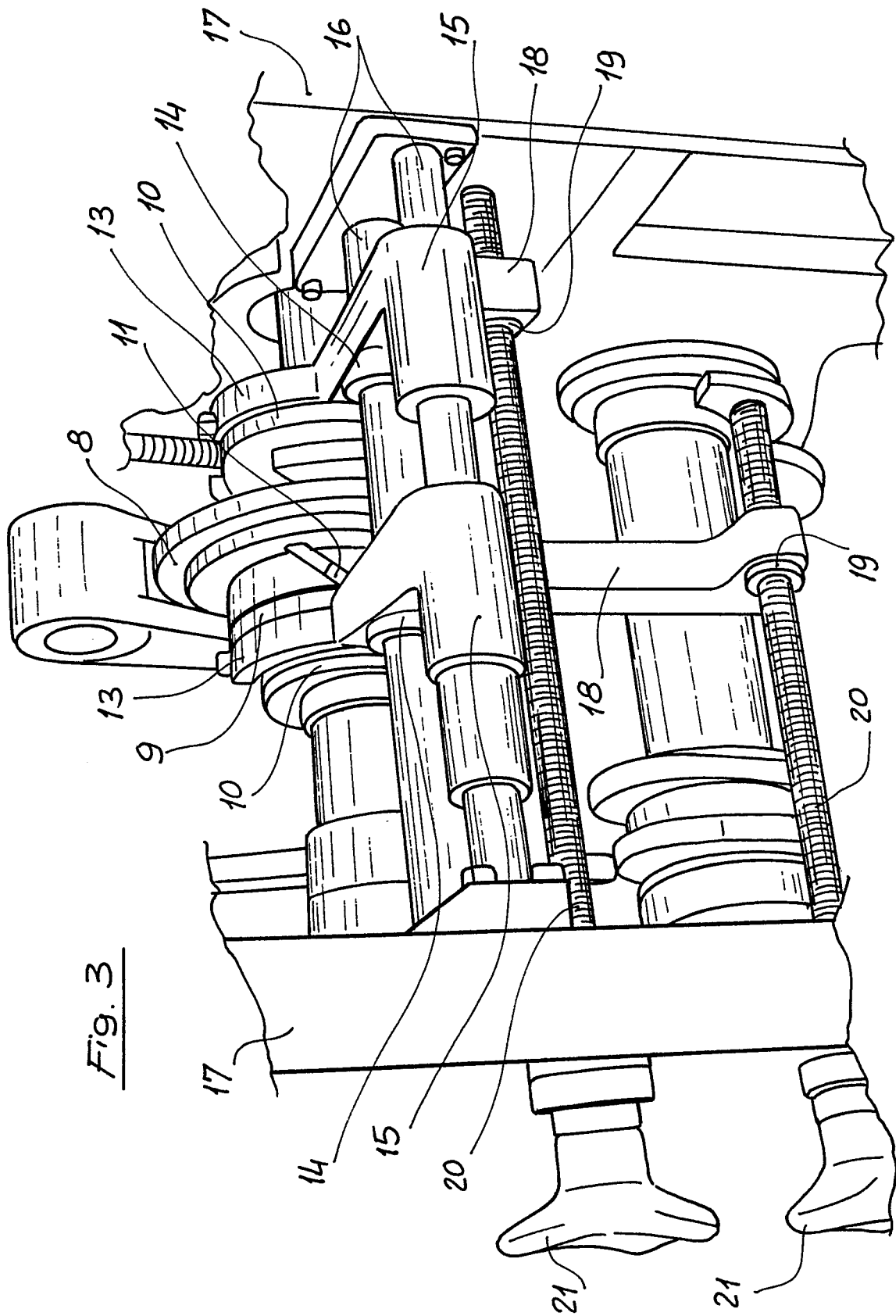
3- A mechanical assembly according to the preceding claims, characterized in that said plate element is provided with a circumferential slot, of circle arch shape, and removably supports an indexable cam, through said circumferential slot a plate being effective to slide, said plate being cantilever wise formed on the perimeter of a collar which is rigidly coupled to said shaft.

4- A mechanical assembly, according to one or more of the preceding claims, characterized in that said linear ridge of said plate essentially consists of an elongated helicoidal portion.

5- A mechanical assembly, according to one or more of the preceding claims, characterized in that in said collars engage corresponding fork members which are slidably coupled, through middle and end tubular elements, on corresponding fixed horizontal small shafts supported between the supporting shoulders of said machine, radially of said end elements there being arranged corresponding lugs including corresponding screw nuts helically coupled to screws rotatably supported by one of said supporting shoulders of said machine.

6- A mechanical assembly, according to one or more of the preceding claims, characterized in that on an end portion of said screws, outside of said supporting shoulders, there is arranged a handwheel for rotating said screws in both directions.





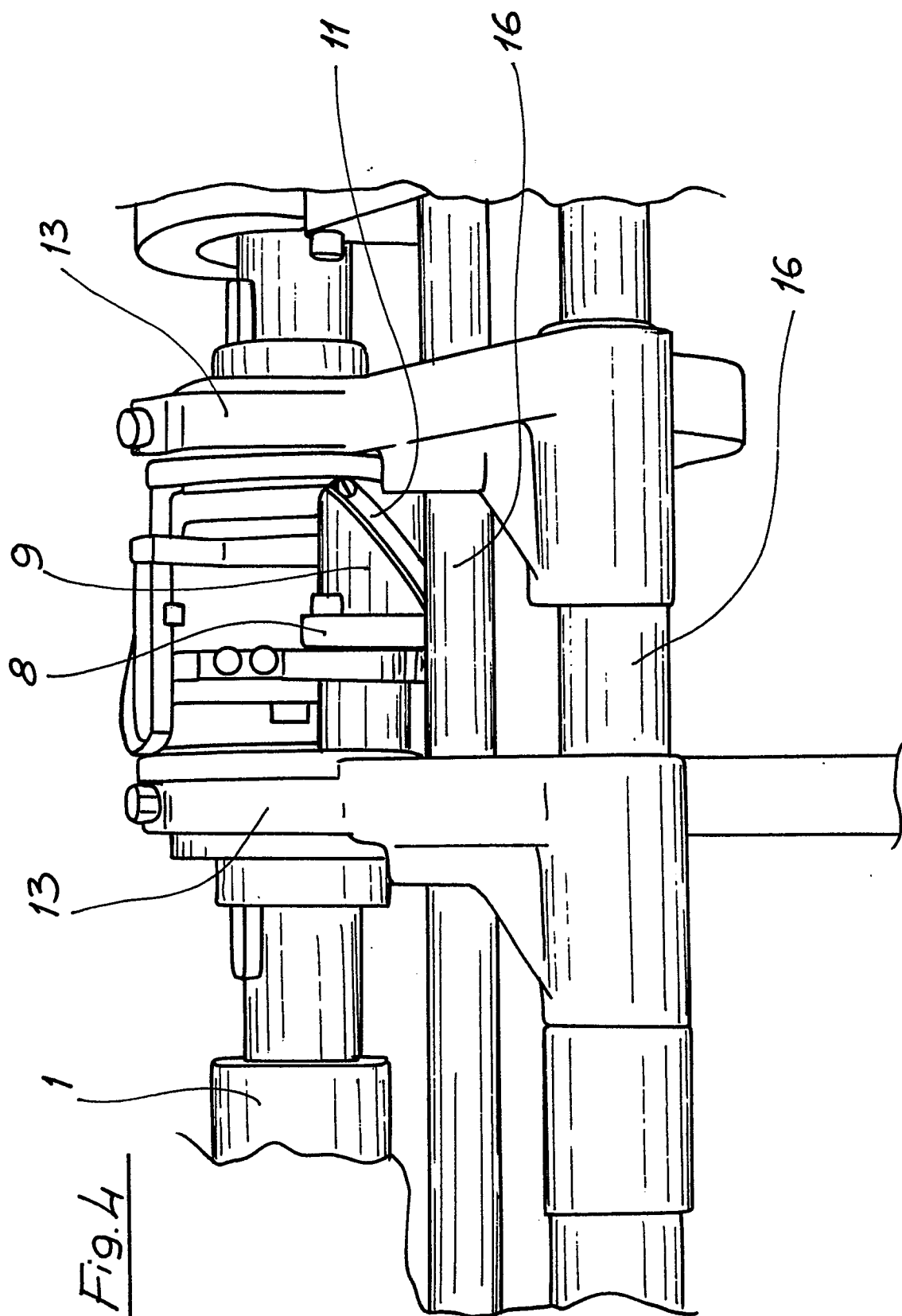
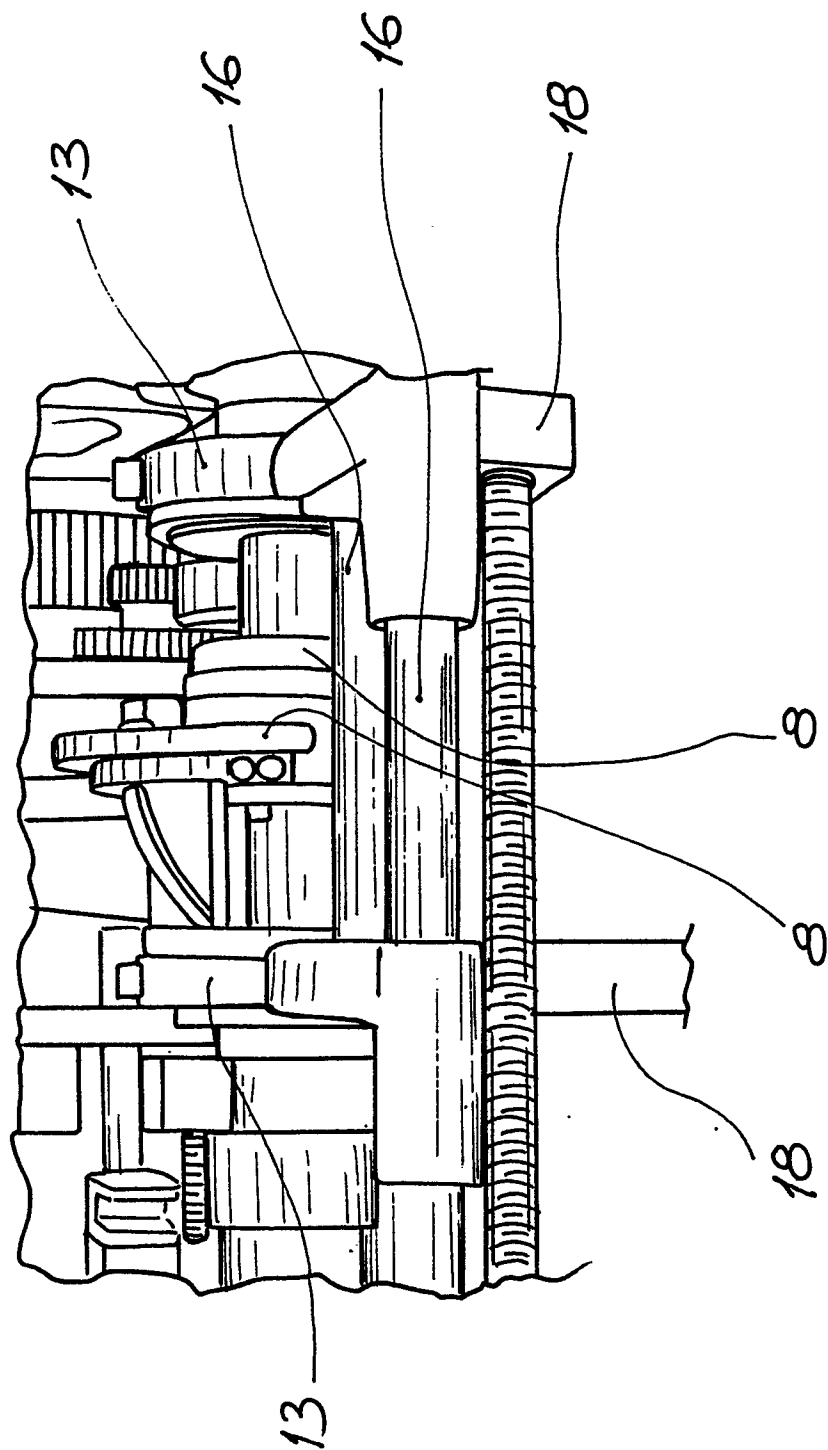


Fig. 5





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EUROPEAN SEARCH REPORT

Application Number

EP 89 83 0281

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.5)
A	US-A-2 964 068 (VAN VOORST) * figures 1,8 * ---	1	B 21 F 35/02
A	US-A-3 194 282 (BERGEVIN) * figure 1 * -----	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B 21 F
The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 08-01-1990	Examiner SCHLAITZ J
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			